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AND RECORD OF PROGRESS IN ARTS, INDUSTRY, AND MANUFACTURES,

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THE various efforts which have been made, and the numerous influences now at work to injure, if not to destroy, Patent Rights; the inefficiency of the many well intended, but ill considered, schemes of Patent Law Reform which have from time to time been suggested, and the tendency of which has generally been to prejudice the Inventor, without advantage to the Public; together with the proceedings so essentially involving the interests of inventors which have already taken place in Parliament, show the necessity of an immediate and active co-operation on the part of those interested in Inventions and in Patent Property, and that an Association for the Protection and Defence of Patent Rights is urgently needed. This Institute has, therefore, been established for the purpose of uniting and organizing the influence of Inventors, Patentees and others. Its objects are:—

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APPLICATIONS FOR LETTERS PATENT.

⁂ In this list (Com.) means Invention communicated from abroad.

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On April 10th.—1320 to 1335.—S. R. Smyth, C.E. A new oxygen or improved furnace bar.—D. Barker. Manufacture of artificial fuel.—F. E. Duckham. Apparatus for actuating railway breaks.—A. McLeish. Mechanical hammer.—R. Shaw.—Mode of driving the spindles used in machines for spinning, doubling, and winding fibrous materials.—J. W. Powell. Valves for regulating and controlling the supply of liquids.—W. A. H. Thorold. Apparatus or means to be employed in disengaging ships' boats.—N. M. Henderson. Destructive distillation of shale or other oil-yielding minerals, and apparatus therefor.—E. Day and Henry Turner. Applicable to steam boilers.—T. Westhorp. Marine distress signals.—A. M. Clark. Apparatus for registering the flow of water and other liquids (com).—A. M. Clark. Colouring matter or dye (com).—F. Wirth. Process of washing yarns, and apparatus employed therefor (com).—S. T. Stein. Construction of cameras for photographic purposes, and the apparatus connected therewith, together with the process employed therefor (com).—O. Reichenbach. Machinery for tipping railway and other waggons.—R. M. Letchford. Night lights.

On April 12th.—1336 to 1345.—J. Smith. Manufacture of pile fabrics.—J. C. Patrick and J. Tracy. Machinery for the manufacture of envelopes and other similar articles.—G. Weigelin. Apparatus for drying bricks and all kinds of earthenware, for glue, wood, turf, starch, linen, wool, silk, paper, &c.—F. Clark. Turnip-cutters.—J. Raper. Machinery or apparatus for boring brush head stocks.—J. E. Billups and E. P. Lee. Permanent coloured and other photographic pictures and delineations.—W. Smith. Manufacture of peat fuel.—A. J. Beer. Arrangements for letting off birds from traps, specially applicable for use in pigeon shooting.—W. Morris. Process or treatment, and compositions or compounds for the improvement of waterproofing, and preservation from mildew and moths, of silk, wool, cotton, furs, leather, paper, and other articles.—J. Macintosh. Arrangements and appliances for preventing ships and other vessels from sinking, also for raising sunken vessels, and saving persons from drowning.

On April 13th.—1346 to 1352.—H. B. Barlow. Refrigerators (com).—E. Vignier. Aerated beverages, and the apparatus to be employed in their manufacture.—H. A. Bonneville. Ordnance, fire-arms, cartridges, ammunitions, or projectiles, and mode of making up or preparing the same (com.) (Complete specification).—W. H. Crispin. Construction of ships and other vessels, and the arrangement and mode of working the sails used in connection therewith.—R. Dunn. Disconnecting or disengaging apparatus applicable to lowering ships' boats, and other purposes.—T. Critchlow. Equilibrium piston-valves, chiefly designed for hydraulic purposes.—G. Haseltine. Machines for clipping or shearing animals (com). (Complete specification).

On April 15th.—1353 to 1363.—T. P. Hawksley. Construction of specula for surgical and other purposes.—T. P. Hawksley. Construction of stethoscope.—H. Edmunds, jun., J. A. Wood, and D. P. Wright. Lighting and heating by the combustion of hydrocarbon or other volatile oils.—M. Knowles and A. Chalk. Looms for weaving.—W. Brooks. Manufacture of pile fabrics, such as velvet and velveteen (com).—N. Clayton and J. Shuttleworth. Expansion gear of steam engines.—C. Smith. Apparatus for crossing channels, passages, or spaces.—S. W. Clough. Construction and arrangement of fire grates and ranges for cooking and other domestic purposes, and cement for uniting the joints of various parts.—R. Atkin. Construction of ships and other navigable vessels, and propelling, ventilating, and steering the same.—A. Browne. Revolvers (com).—H. Huish, M.D. Apparatus for lowering boats at sea.

On April 16th.—1364 to 1383.—V. Petherick and J. W. Rock. Safety valves.—J. McKay and W. MacGeorge. Apparatus for producing blast for smithy fires and other purposes.—B. Giles. Cooking apparatus.—T. Black. Steam engines and apparatus connected therewith.—T. Black. Steam boilers.—W. C. Henderson. Horticultural and other frames to receive glass, and means for affixing glass therein.—A. M. Clark. Preservation of alimentary substances, and apparatus for the same (com.)—W. Foot and H. S. Gregory. Hoops or ribs for railway trucks or vehicles.—G. Johnson and J. Shaw. Steam engines.—J. Booth. Kitchen or cooking ranges.—J. Knowles. Mode of producing the blast in cupolas and furnaces.—J. Foster and J. H. Foster. Construction and arrangement of domestic cooking range or stove applicable to the present constructed kitchen or cottage ranges.—Frank Smith. Construction of railway signal bells.—W. Shaw. Machinery for making or forming and pressing bricks or other plastic forms.—A. P. F. Desmares. Process of, and machinery for, producing relief designs or patterns on woollen fabrics.—T. A. Weston. Machinery or apparatus for raising, lowering, and suspending weights and heavy bodies.—S. H. Hodges and H. F. Wheeler. Machines for trimming setting, or otherwise operating upon the soles or heels of boots and shoes. (Complete specification)—J. Denley. Fire-places or grates.—W. Hockley. Composition for treating, impregnating, and coating wood, so as to preserve and render it impervious to water and other fluids.—I. B. Harris. Mode of preparing wire cloth coated with india-rubber, for the

BRITISH MUSEUM

manufacture of washers, piston packing, hose, and such like articles therefrom.—E. L. Berthon, M.A. Apparatus connected with collapsible boats, and also for facilitating the lowering and detaching of the same, and other boats.

On April 17th.—1385 to 1399.—M. W. Ivison, C.E. Sheep dip, which is also applicable to animals other than sheep.—E. Ward. Sewing machines.—M. Benson. Constructing, arranging, and working steam pumping machinery (com).—J. Fowler and G. Mackay. Carriages and waggons with folding heads or coverings.—L. J. Todd. Steam tramway and other locomotives.—J. H. Johnson. Pulleys and pulley blocks (com).—C. Eskrett and H. Searle. Envelopes or "hairs" used in extracting oil from oleaginous seeds and oil-cake making.—J. H. Faulkner and W. Satter. Measuring or meter taps or valves.—G. Cubitt, C.E. Double furrow ploughs.—H. S. Cederholm and C. Peterson. Ships' logs. (Complete specification.)—R. Coddington. Telegraphic apparatus (com).—T. Nicklin and J. Frost. Ovens for firing pottery-ware, viz., china, earthenware, bricks, and other like purposes.—T. J. Smith. Manufacture of iron and steel (com).—J. T. Griffin. Apparatus or appliances facilitating the cutting of screw threads upon or in tubes, bolts, stems, rods, pins, and nuts (com).—J. B. Rickards. Compounds or combinations of ingredients for cleansing and bleaching vegetable fibres, such as jute, hemp, flax, and cottons.

On April 18th.—1400 to 1415.—A. A. Dixon. Injector for steam boilers.—G. Malcolm. Machinery or apparatus for printing ornamental fabrics.—R. High. Desks adapted for use in schools.—W. Harvie. Lamps wherein gas is burned.—W. Harvie. Lamps.—E. Casper. Packing for the stuffing boxes of steam engines, pumps, and other like machinery (com).—J. Arnold. Instrument or instruments for vaccinating.—Rev. G. H. Forbes. Manufacture of cements, artificial stone, and plaster of Paris.—H. Sumners and Hugh Fraser. Danger, warning, and fog signalling apparatus.—J. Large. Additions to railway carriages.—B. Hunt. Apparatus or means to be employed in connection therewith for firing ceramic and other articles (com).—J. Bragg. Obtaining motive-power from running water.—T. Cadett. Production of gas for lighting and heating purposes.—E. A. Cowper. Moulds for casting steel ingots.—W. H. Tooth and W. H. Tooth, jun. Fire bricks and other articles intended to resist the action of fire, including compositions to be used in the manufacture of the same.—A. V. Newton. Mode of, and apparatus for, manufacturing metal tubing (com).

On April 19th.—1416 to 1430.—G. Pearson. Construction of doubling frames for cotton and other fibrous materials.—T. Carr. Disintegrators.—W. E. Gedge. Constructing tents and tent equipment (com).—T. F. S. Tinne. Motive-power engines.—E. Rayner. Bung-cutting machine.—B. Hunt. Preparation of wood, or other ligneous or vegetable matter, for the manufacture of paper, cardboard, and other analogous products (com).—J. Deeley and J. S. Edge, jun. Breech-loading small arms, part of which may also be applied to muzzle-loading small arms.—W. Morgan-Brown. Aneroid barometers (com).—R. Asquith. Expansion gear for working and regulating the expansion or cut-off valves of steam engines.—G. W. Rendel. Mode of mounting and working ordnance.—G. Poirier. Construction of boots and shoes, or other like coverings for the feet.—J. Cartwright. Manufacture of back saws.—A. M. Clark. Cans for preserving fruits and other substances (com).—P. A. Blake. Automatic means for indicating the presence of fire in buildings.—J. W. Gray. Reservoir for storing petroleum or other inflammable oils or spirits (com).

On April 20th.—1431 to 1448.—H. P. Fenby. Method of obtaining circular motion in one direction from circular motion acting in one or alternate directions, the same being applicable as a clutch or brake.—W. Dewar. Implements for planting potatoes.—J. Rochford. Spring safety valve for marine, locomotive, and stationary boilers.—W. A. Lyttle. Preservation of timber.—G. Spencer, C.E., and W. M. Smith. Parts of carriages and trucks for railways and tramways.—J. Rhodes, E. Rhodes, and W. Frankland. Apparatus for consuming smoke and economizing fuel for steam generators and fire-grates.—C. De Negri. Engines.—J. Taylor. Constructions of walls and roofs.—J. Taylor. Roofing tiles.—W. Morgan-Brown. Transmission of motive power and apparatus for that purpose (com).—H. A. Hülsenberg. Working slide valves by steam pressure, and apparatus therefor.—J. Henderson. Propulsion of steam or other ships or vessels, and construction and arrangement of machinery or apparatus therefor.—H. B. Barlow. Mode of, and apparatus for, cooling fluids and liquids (com).—P. Lerina. Method or system of acquiring a superior and expeditious handwriting.—H. Y. D. Scott. Treatment of night-soil and sewage matters, and the manufacture of manures therefrom.—J. E. Tavenet. Vehicle for paints used in house, ship, and general work.—C. O. Bostelmann. Apparatus for measuring and controlling the sale of beer and other liquids.—G. T. Bousfield. Machinery for shaping and polishing stone, marble, and other substances (com).

On April 22nd.—1449 to 1456.—J. E. Billups and E. P. Lee. Permanent coloured and other photographic pictures delineating or devices on porcelaim and other fictile ware.—R. H. Courtenay. Magneto-electric induction machine.—A. J. Ammeus, M.D. Preparing medicines (com.)—C. W. Torr. Furnaces for steam boilers, which improvements are also applicable to furnaces for various other purposes.—F. J. Cheesbrough. Machine for fitting the elastic gores in gaiter shoes (com.)—E. W. Thomas. Acting steam water-lift and injector.—J. G. Granston. Machinery for drilling or boring rock, stone, and other materials, and for boring or cutting coal.—G. E. Donisthorpe, jun. Apparatus for registering the number of passengers carried in public carriages and the distance each has travelled.

On April 23rd.—1457 to 1475.—F. Savage. Traction engines and road locomotives.—J. Potts, jun. Permanent way of railways.—F. Delma. Sunshades (com.)—J. B. Rickards. Gradients for cleansing and bleaching wools and other suitable fibres and fabrics.—W. Haggett. Manufacturing, arranging, combining, compressing, and treating iron, steel, and other metals and materials to increase their strength, power of resistance, and usefulness. (Complete specification.)—A. R. Poole. Apparatus for actuating and setting in motion, locking, interlocking, and controlling railway points and signals.—R. Mackie. Manufacture of caps or bonnets and the means employed therefor.—J. Hutchinson, and J. Hollingworth. Picking arms employed in looms for weaving. (Complete specification.)—S. Remington. Breech-loading fire-arms (com.)—R. Stenson and A. St. Cuff. Pulping and compressing machine for the treatment of peat and the manufacture of the same into fuel.—E. T. Hughes. Magazine fire-arms (com.)—A. J. Derney. Apparatus for raising sunken ships, and the method of fastening, attaching, and placing such apparatus.—F. W. Colls. Treating rosin oil, to obtain therefrom a neutral oil, suitable for lubricating machinery and for other uses.—C. A. de Laskarzewski and T. H. Noyes. A new musical instrument.—I. Baggs. Manufacture of gas for illuminating and other purposes.—P. B. Watson. Gas burners.—S. Kluh. Stamp for printing on china, earthenware, metal, wood, or other substances.—G. A. Huddart. Construction of fish for railways.—B. Birnbaum. Garment for the use of person when driving, travelling, camping, and campaigning.

On April 24th.—1476 to 1494.—H. L. Hall. Pulley racks for blind cords.—F. W. Gerhard and J. W. Caddick. Production of iron and steel, and a furnace used therein.—S. W. Smith. Apparatus for saving, consuming, and utilizing gases from blast and other furnaces, cooking and other ovens.—M. Kitchin. Fleshing machines employed in the manufacture of leather.—W. Lloyd. Apparatus for consuming engine coal in fire-grates, termed a small coal segmental glow fan.—J. Carpenter. Construction and arrangement of apparatus for supporting, lowering, attaching, and detaching ships' boats, parts of which are also applicable to other purposes.—W. S. Underhill. Apparatus to be used with cages for mines and shafts for the prevention of accidents through overwinding or breakage of the winding rope.—C. Cooper. Apparatus for washing linen and other fabrics.—J. Bartlett. Means of indicating weight on platform weighing machines and weigh-bridges.—J. Stanley. Wheels for vehicles for facilitating the draught or propulsion thereof.—T. Gray. Process of treating wood and other vegetable fibres for the manufacture of paper.—T. A. Skelton. Street lanterns to facilitate lighting.—J. Quick. Window frames and sashes.—J. H. Johnson. Production and treatment of colouring matters (com).—F. L. Rovedino. Artificial fuel.—W. Burnett. Apparatus for supplying oil for lubrication.—F. Billingham and W. McDowall. Construction of machines employed for washing and wringing textile fabrics.—W. Burnett. Machinery for utilising the dynamic effect of water or other fluids.—W. McNabb. Apparatus for drawing together and securing the ends of hoops or bands around bales of cotton or other merchandise; also applicable to other useful purposes.

On April 25th.—1495 to 1510.—S. F. Pells. School desks.—W. Parlby. Producing gases, and in the construction and arrangement of the apparatus connected therewith, the whole of which improvements are applicable to the manufacture of gas for illumination, and part thereof may be applied for obtaining gas for heating purposes.—A. Sauvée. Apparatus for extracting earth or soil from foundations sunk under air pressure, parts of which improvements are also applicable to the filling up of these foundations with concrete or other material (com.)—H. H. Doty. Roof lamps for railway carriages for burning hydrocarbon oils.—P. Jensen. Materials for roofing (com.)—L. Thiercelin. Recovering iodine from phosphates of lime during the manufacture of super-phosphate of lime.—J. B. Brooks. Rings or suspenders for suspending keys, watches, articles of jewellery, and for other like purposes.—G. Mathis. Sculpture copying apparatus.—O. E. Pohl. Manufacture of salt, and apparatus or appliances employed therein.—J. West. Apparatus used in the purification of gas.—J. Graham. Improved shirt-front or garment.—W. C. Miles. Railway carriage and other lamps.—J. T. Griffin. Means of economising fuel, developing heat, consuming smoke and gases in steam boiler and other furnaces, also in appliances therefor (com.)—T. A. Edison. Electric telegraphs.—H. Y. D. Scott. Treatment of sewage matters and the deodorization of night soil.—H. O'Berne. Carriages.

On April 26th.—1511 to 1527.—T. F. Parsons. Cleaning and polishing tin and other plates.—T. Grimbleby and F. Grimbleby. Machinery for making bricks and other plastic forms.—H. Bridge. Means for assisting riders to mount their horses.—H. Harrison and F. Page. Manufacture of artificial or prepared fuel from anthracite dust or culm, or from other coal dust.—G. Davis. Keels of ships and boats.—R. E. Donovan. Apparatus for stoving or heating tobacco.—G. Haseltine. Railway carriage couplings (com.)—T. E. Yates, H. Yates, and W. H. Kellett. Wire cards and machinery or apparatus used in the manufacture thereof.—P. Trumble. Manufacture of artificial fuel and fire lighters, and the apparatus connected therewith.—J. Hanson and T. Hunter. Agricultural apparatus for thinning turnips or other roots or plants.—I. A. Timmis. Armour plates or shields.—T. Nixon and P. Quin. Manufacture of sulphate of soda.—C. Barlow. Rifling ordnance (com.)—G. M. Webster. Stove for heating and cooking purposes.—R. Walker. Improved roasting jack and baster.—T. W. Minton. Ovens for firing pottery, glass, and other substances.—A. Tucker. Apparatus for feeding calves and other young animals.

On April 28th.—1528 to 1544.—J. H. Brown. Production of a bituminised coal for manufacturing and domestic purposes.—H. Lyon and E. Robinson. Apparatus for indicating and giving warning of the contents of gasometers, brewers' vats, and other similar receptacles, also useful for giving warning of the rise and fall of water in rivers, weirs, reservoirs, and other fluctuating collections of water.—D. Mannini. Adapt the genet (broom) to the fabrication of canvas, ropes, mats, &c.—J. Oldham, jun. Promoting economy in fuel in steam generators.—W. Thompson. Manufacture of white lead and apparatus therefor.—F. W. Colls.—Manufacture of gas for heating and lighting purposes, and the apparatus employed therefor.—W. P. Savage. Paving.—J. Jeyes and Oliver Jeyes. Manufacture of fuel.—T. Onion and W. Onion. Domestic fire grates or ranges.—A. Bradbury. Furnaces to be used for raising steam, and other similar purposes.—A. J. Buncher. Manufacture and fixing of composition for coating paper, calico, wood, metal, or other surfaces.—J. Wallace. Apparatus for distilling.—I. B.

[Continued on Page 117.]

Scientific and Literary Review,
AND RECORD OF PROGRESS IN
ARTS, INDUSTRY, AND MANUFACTURES,
INCORPORATING THE
JOURNAL OF THE INVENTORS' INSTITUTE.

JULY 1, 1873.

THE NATIONAL IMPORTANCE OF INVENTORS.

Last month the wail of woe and cry of grief for the great loss industrial and public progress had sustained by the decease of the late Mr. Robert Marsden Latham was our principal topic; this month, with his loss still fresh to us, we are sympathetically led to turn our attention to a subject that appertain to what was his life-long mission, feeling that in so doing we shall be performing work the most satisfactory to him that could possibly be performed. The subject we allude to is the national importance of the inventor, which has most opportunely been brought before us by some passages contained in a work by Mr. William Hoyle, reviewed in another column, entitled "Our National Resources and How they are Wasted." It is true this contains nothing more than a plain statement of facts, but they are so succinctly and pertinently put that we feel it ought to be placed upon record as part of the inventor's case.

In the year 1743 (says Mr. Hoyle) commenced those improvements which have continued to progress, and which have resulted in the present expansion of our manufacturing industries. It was in this year that John Ray, of Bury, invented the fly-shuttle and picking-peg. Before his time the weaver, in order to work his shuttle, had to stretch his arms from side to side of the loom, and if the cloth was more than 36 inches wide it needed two persons to do this, one being unable to reach across the loom. Kay's invention consisted in making the lathe in which the shuttle runs about 18 inches longer, so as to permit of a shuttle-box on each side of the cloth, and then, by means of a string fastened to the picker on each side of the loom, and joined to a handle in the middle, the weaver was enabled to work the shuttle from the centre. A great loss of time was thus avoided, and, where wide cloth had to be woven, one person, by the aid of these improvements, could do the work formerly done by two.

In the year 1769, Robert Kay, the son of the above John Kay, invented the drop-box. This invention consisted in constructing the shuttle-box so that it would rise or fall, and enable the weaver, when using alternately different kinds of weft, to keep his loom at work; whereas, previously, he had to stop his loom to change his shuttles. A great saving of time was in this way effected, and the out-turn of work materially expedited.

In the year 1767, or thereabouts, James Hargreaves, a poor weaver, of Blackburn, conceived the idea of the spinning-jenny. Before his time, one person could only tend one spindle and spin one thread at a time. By means of the jenny, one hand was enabled to work twenty or thirty spindles at once, and thus turn off an immensely greater quantity of work than formerly.

In 1769, Richard Arkwright, of Preston, invented what is generally termed the water-frame, or as it is sometimes called, threstle-frame. This was an application of rollers to the stretching of the yarn, so as to regulate the counts (or thickness of the thread) uniformly, and stretch the yarn with precision, these rollers being so arranged as to work in connection with the spindle.

In the year 1779, Samuel Crompton, of Bolton, combined Hargreave's jenny with Arkwright's rollers, and thus brought out the mule. Through the skill of Mr. Roberts, of Manchester, the mule was made self-acting, the spinner not having now to work or guide the mule, but simply to see to its being kept in order. The value of these accumulated inventions will be seen when it is remembered that, as has been stated, before the invention of Hargreaves, one person could only tend one spindle; at the present time, one man, aided by a grown-up youth and boy, will tend a pair of mules having 1,200 or 1,300 spindles in each, or 2,600 spindles altogether. If these facts be carefully examined, it will be seen that one individual, aided by the machinery of the present day, will produce as much yarn as seven hundred and fifty persons could have done a little over one hundred years ago.

From these improvements there has resulted,—
1st. A large diminution in the cost of yarn, and
2nd. A *considerable increase of wages.*

According to Mr. Mann, a spinner in 1760 could only earn from 2s. to 3s. weekly; whereas, now, he can earn from 30s. to 35s. weekly. In the time of Crompton, which was after considerable improvements had been made in machinery, the cost of spinning weft, 40 hanks to the pound, was 14s. per pound; for No. 60's 25s. per pound; and for No. 80's 42s. per pound. *Now*, the respective cost of producing will be, 40's 4d.; for 60's 7½d.; and for 80's 1s. per pound.[*] Such are the advantages resulting from the invention of machinery.

In 1764 the art of calico printing was introduced into Lancashire, and gave a considerable impetus to the cotton industry. A further stimulus was given to it by the discovery and application of chlorine in the process of bleaching, which was introduced from France by James Watt, the inventor of the steam-engine, and applied at the works of his father-in-law, Mr. MacGregor of Glasgow. Before the application of this discovery, nearly all the cotton goods, in order to be bleached, had to be taken to Holland, where they lay for five or six months in the open air in the fields around Haarlem. At the present time, the bleaching of calicoes can be effected in as many days as it formerly took months, and is also done more effectually.

Mr. Hoyle goes on to show that all these inventions and improvements would not have sufficed to place our national industry in its present proud position but for Watt's improvements in the steam-engine, and the inventions of gas-lighting, steam-ship propulsion, and railways.

However true all this may appear, and it will, no doubt, seem very commonplace to most inventors, yet the national importance of inventors is not recognized by the Government of this country, which has generally been ready to dispute their claims to remuneration, and now has come boldly forward to say that in future no payment whatever shall be awarded them in respect to any invention the Government may find useful in its service—a proposition that so outrages all our notions of right and justice, that we feel that if the Inventor's Institute will only bestir itself with energy the Government will never dare to make such a proposition one of its principles of action.

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[*] For the information of those who are not conversant with manufacturing phraseology, it may be stated that a hank contains 840 yards, and that when "counts of yarn" are spoken of, the number of hanks it takes to weigh a pound is meant. Thus, by 60's yarn is meant yarn of which it takes 60 hanks, each of 840 yards, to weigh one pound.

Reviews.

Description of Anderson's Feathering Propeller. With Plate. Second Edition, Revised. London: W. Mitchell and Co., 39, Charing Cross. 1873. [Pamphlet].

THE following extracts will afford the reader a general view of this subject:—

This propeller has undergone material improvement in the details of its construction since the former description of it was published, and now comprehends the important advantages mentioned in the following description, viz.:—

The mode of arranging the action of the propeller may be varied to suit any special requirements, but the method preferred for vessels of ordinary build is as represented in the plate, where it is placed under the quarters, one blade working on either side.

The action of the propelling blades upon the water is perfect and continuous, and therefore calculated to obtain the highest rate of speed from the engine power.

The blades are perfectly protected from damage by floating wreck or other objects.

They will act effectively either when deeply immersed or with the lightest draught of water in which a vessel can be made to float.

They may be readily turned fore and aft when not wanted for steaming, so that there is no obstruction to the speed, or to the steering of the vessel, as with the screw.

They may be detached altogether when required without putting the vessel into dock.

The direct action of the blades will give good steerage; and when quick manœuvring is necessary the steering may be assisted by either modifying or wholly reversing the action on either side; this may be done without stopping or interfering with the engine, and is effected by means under the immediate command of the steersman, whereby the blade on the port side may be feathered to any angle without altering the starboard, or *vice versa*.

In the event of the rudder being damaged the vessel may be steered by means of the propeller alone.

The blades being able to backwater, either separately or together, no reversing gear is required for the engine, and as the latter acts horizontally in a line with the keel, it occupies little space in the vessel.

These remarkable qualities are attained by very simple means, and are alike valuable for ships of war and for merchant vessels; the propeller is also well adapted for the purposes of canal navigation.

Its construction is as follows:—

A transverse shaft is fixed in a suitable frame across the after-part of the vessel, fitted with a crank, to be driven by the engine; the shaft passes through stuffing boxes to the exterior of the vessel, and has at each extremity short crank arms set in opposite directions, and bent outwards to an angle of about 45 degrees; to these crank-arms are attached by ring-collars, vertical guide-rods, the upper portions of which pass through apertures under the quarter, to the interior of the vessel, and to their lower ends the propeller-blades are attached. The upper portions of the guide-rods are flattened and twisted for a portion of their length, so that that part above the twist is at right angles to the part below it.

Guide-swivels, the particular construction of which is described hereafter, are pivoted on either side within the vessel and immediately over the apertures through which the guide-rods are admitted. The flat and twisted portions of the guide-rods pass in succession through the swivels at each revolution of the shaft, and the propeller-blades attached to them are thereby guided and feathered, so that they act with their flat sides to the water for the forward stroke, and pass edgewise through it for the back stroke.

The guide-swivels may be variously formed, but the mode preferred by the inventor is to construct them as rectangular frames, with a pivot at either end. Each of these frames contains two blocks, either of wood or metal, with a space between them sufficient to allow of the passage of the guide-rod, the inner faces of the blocks are rounded so that while bearing upon the guide-rods the latter are nevertheless able to pass easily, and to turn as the twisted portions of them pass through. These blocks are fixed in their frames by bolts passing through slots in the sides of the latter, so that they may be adjusted at any time to their position and bearings. To keep the guide-swivels always in their proper position at right angles to the guide-rods, a tail-piece is attached to their lower sides, having a circular aperture through which the guide-rods also pass, and by which the guide-swivels are prevented from inclining to right or left, when the vessel heels on one side.

For the purpose of changing the direction of the propeller-blades, so that either of them may be made to back water, or act with reduced propelling effect when required, the guide-swivels are, each of them, doubly pivoted in gimbals, carried upon standards attached to a circular plate, fitted into a fixed flange, wherein it may be turned round to the extent of a quarter-of-a-circle, by means of a lever handle; when the guide-swivels are thus shifted round, the guide-rods and propeller-blades attached to them are turned to the same extent in the sockets or ring-collars which attach them to the crank-arms, and present either a diminished surface to the water or their edges only, according to the extent to which the lever-handle is shifted; when it is shifted to the full extent the flat surfaces of the blades face the water during the back stroke, thus creating back water.

The moveable plate, or some other part, should be provided with a bolt or pin for retaining it in the position to which it may be turned.

When it is desired that this action of the propeller-blades shall be controlled from an upper deck, each of the two moveable plates on which the guide-swivels are carried, instead of having a lever handle attached directly to it, should be furnished with cogs on a fourth part of its circumference, actuated by a pinion wheel attached to a perpendicular rod passing upwards through the deck, and fitted at its upper end with a handle or other means of turning it, and with any simple arrangement for keeping it in the position to which it may be moved for changing the direction of the blades. This arrangement is illustrated in the plate.

Another purpose of the arrangements just described is for setting the propeller-blades edgewise when not wanted for steaming.

The general effect of the propelling arrangement is, that at every revolution of the transverse crank shaft the propeller-blades on either side pass in succession through the water, and make, each of them, a forward and back stroke, feathering as they change from the one stroke to the other, one of them being always propelling while the other is returning.

An iron plate is attached vertically under the quarters of the vessel on each side so as to cover the propellers and prevent anything from coming in contact with them.

The application of the propeller to channel passenger vessels is adverted to, and great advantages are stated as obtainable from the adoption of these propellers.

The Gold Yield of Nova-Scotia, 1860-1872. By A. HEATHERINGTON. Compiled from Corrected Official-Records.

THIS little pamphlet contains useful practical information on a subject which will be interesting to many of our readers. It is accompanied by tables such as have been published annually since 1865, which show the gradual development of the provincial gold industry; and it is to be hoped that they afford useful data not only for the statistician and political economist, but also for the cautious investor who would naturally seek assurance for the stability of any enterprise in which he proposed embarking in an unembellished statement of results extending over many years. Readers who care not to wade through a long array of figures may take interest in the subjoined summary.

GENERAL RESULTS.—Making allowance for quantities stolen and otherwise not reported—approximately ten per cent. of the whole—the value of the total gold yield from the autumn of 1860 to the close of the year 1872 was £958,000. The traceable and officially recognized yield for the years 1861 to 1872 inclusive, is 215,871 ozs., or £863,484 in value; of which £12,532 (3,133 ozs.) from alluvial washings, and £850,952 (212,738 ozs.) from quartz treated in the mill. The largest declared yield in any one year for the whole province was £109,258 (27,314½ ozs.) for 1867; the largest annual yield of any separate district £57,617 (14,404¼ ozs.) for Waverley in 1865; the largest annual yield of any single mine £34,910 (8,727½ ozs.) from the Tudor mine at Waverley in 1864—not reckoning about 3,000 ozs. known to have been stolen; and the largest bar of gold ever cast was in June 1865, from the same mine, the property of Mr. Leopold Buerkner, the weight being 1,200 ozs. and its value £4,800. The largest aggregate amount produced from mines owned by companies, is £220,000 from the Ophir at Renfrew, the Wellington and Palmerston at Sherbrooke, and the American at Waverley. The largest amount produced from a mine owned by one person is £72,000 from the Tudor at Waverley. The largest return in proportion to the workings is £72,000 from the Wellington mine on a 13 inch lode, opened only 180 feet in length and 500 feet in depth.

Promoters of public companies have received about £1,000,000 stg. for claims. The largest price ever paid was £4,500 for two free claims at Waverley of 150 feet each. The largest capital of any mining corporation, proportioned to their holding, was that of the Tipperary and New York Company, who, owning only 300 feet in one and 150 feet in another district, organized for the amount of £50,000.

The provincial Government has received about £50,000 for rents and royalty.

The cost of 2,227,550 days' labour, estimating wages at five shillings a day—which is higher than the average of the first five years—was £556,888.

The cost of 55 mills, the greatest number at any time in operation, may be given as £77,200; allowing £1,600 each for 37 steam, and £1,000 each for eighteen water mills.

The cost of supplies, rated at 5s. for each ton raised, amounted to £56,478.

Incidental expenses, reckoned at ten per cent. on the totals for labour, supplies and machinery, were £69,434.

The total legitimate cost, then, of eleven years declared yield, Government exactions included, was £810,000, leaving a margin of £29,484, reserves comparatively intact, and plant and recoverable tailings worth £75,000.

The production of the several proclaimed districts from the quartz mines alone, continuing developments on lodes now actually worked to a mean depth of 1,000 feet, and confining them to present lateral bounds would, according to the average of declared yields, amount collectively to £27,000,000.

It may be stated that quartz is the chief source of gold in this Province; but several competent authorities, such as Professor B. Silliman and Campbell, incline to the opinion that the auriferous *débris* of this Province have been swept beneath the ocean; but M. M. J. W. Dawson, J. A. Phillips, T.

Sterry Hunt, the late Auguste Michel, and A. R. C. Selwyn, who, in the succession named, have examined and reported on this region, consider that systematic search for alluvial gold might well repay the prospector. At Tangier Harbour a nugget weighing 27 ozs. was found in 1862; and at Middle River, Cape Breton, and Gay's River pieces of gold weighing from 10 grains to 17 dwts. have been washed. At Nine-Mile River, Stewiacke, Indian Path, and Gold River, the alluvions are deep and impregnated with fine gold. From the last mentioned district Dr. How obtained very remarkable results, which are cited in his "Mineralogy of Nova Scotia," and in Dr. Dawson's "Acadian Geology," and were, to a great extent, practically sustained by Mr. Michel's subsequent experiments on the ground. Recent trials on an extended scale at Gay's River gave very satisfactory returns.

Our National Resources; and How they are Wasted. (An Omitted Chapter in Political Economy.) By WILLIAM HOYLE, Author of "An Enquiry into the Causes of the Long Continued Depression in the Cotton Trade," &c., &c. London: Simpkin, Marshall, and Co. Manchester: John Heywood, 141 and 143, Deansgate. (Cheap Edition.)

THIS little book has our highest approbation, as far as it tends to show—as it does very lucidly and strikingly show—that the inventions and improvements in machinery by our countrymen have given to us exceptional facilities for the acquisition of wealth, and that, aided by these various natural advantages, we have developed our trade and commerce in colossal proportions; indeed, we are so pleased with this portion of the work that we have used it in a former part of the present number of this journal. But when the author refers the main cause of bad trade and national waste, to the unwise expenditure of money, and pauperism, summing up all these evils as expressed by the liquor traffic, and advocates its suppression, we think he shows, like most political economists, far more knowledge of industrial pursuits than he does of man, and his many-sided ways and character.

An Essay on the Physiology of the Eye. By SALOM HENRY SALOM. London: Salom and Co., 137, Regent-street, W., 1873.

THE "windows of the mind," as the eyes have been termed, cannot fail to be an interesting topic to every sensible man; hence a readable work on their psysiology deserves the best attention of all friends of science and literature. To say that Mr. Salom has produced a really scientific and readable book on the subject, is to do him no more than justice. The work reviews the subject *ab initio*, setting out with various psychological propositions and apt illustrations of them; thence the author passes to the more practical part of his subject, but we should have to quote too largely to make the matter properly understood. The following extract will, however, afford the reader some idea of the contents of the book:—

"Of the many elegant adaptations of means to ends, offered by the eye to our wonder and admiration, none is more extraordinary nor more exquisitely delicate than the apparatus by which that organ is balanced. Set between six muscles, to which a quantity of highly delicate nerves is supplied, the eye ball can, with great ease, be turned rapidly and accurately in all directions. The manner in which change of ocular direction is effected, is not, however, arbitrary; the *modus operandi* being highly confirmatory of the doctrine that the eye is under the influence of the mechanical force of light-undulations. 'Observations on our own eyes and on those of others, show that the visual axis may be directed in many different directions, but it is only very rarely that the angle can be changed directly, that is, immediately. This change of direction is nearly always effected by zigzag or wave lines. The eye is doubtless always carried directly to the object, but this is the result of practice and habit. . . . The numerous ways in which the zigzag and undulatory movement of the visual axis is performed during the change of direction of the eye, may be demonstrated by looking in the evening, at a well-lighted lantern, and observing the directions of the images which follow the motion of the eyes. It will be plainly evident after looking repeatedly, first at the lantern, then at an object, that the eyes seldom move in a straight line but that, when we do not strive against it, they move in zigzag or undulating lines.' The result is of great importance to our theory. For, from the hypothesis that the eye is in a constant state of oscillation in respondence to undulations whose planes of action are transverse to the direction of the light, it would appear naturally to follow that the eye's traverse must also be effected in a wavy or zigzag manner. That the eye is in a state of motion through the action of light is strongly confirmed by the circumstance that when the eye seeks to change its position it naturally does so as if under the influence of wave action."

This theory of motion produced by the action of light is the central point of the theory Mr. Salom seeks to support.

American Railways as Investments (Cracroft's Investment Tracts). By ROBERT GIFFIN. London: Edward Stanford, Charing Cross.

THE object of this treatise is to put before the British public a favourable view of American railways as investments, and this, we think, the author has succeeded in doing; but whether the opinions expressed in this work are fully, or only partially, justified when all facts concerning these railways are duly weighed and considered, we must leave others to judge for themselves. We can only say that persons seeking investments will do well to consult this work.

Electricity and Magnetism. By FLEEMING JENKIN, F.R.S.S.L. and E., M.I.C.E., Professor of Engineering in the University of Edinburgh. London: Longmans, Green, and Co., Paternoster-row.

THIS work forms one of the excellent series of books that are now being issued by the Messrs. Longman, and called text-books of science, being specially designed "for the general use in schools" and "self-instruction of working men." The particular work before us is one that may be read (as we have read it) with much pleasure and instruction alike to those for whom it is specially designed and others who may be perfectly acquainted with the subject treated in this book, and that as regards the mode and character of the work, it fully bears out and maintains the high standard of merit which may reasonably be expected of the author. We have observed none of those errors which in some of the books issued for a like purpose as these text-books are so often found, and which are written with the definite purpose of simply embodying the principles of the science enumerated in the syllabus of the Science and Art Department of South Kensington, and, for that reason, are but mere fragments of the science sought to be imparted rather than that which it is to be wished should be had. In the introduction of this work the author states "that in England, at the present time, it may almost be said that there are two sciences of electricity and magnetism taught, one that is taught in ordinary text-books, and the other a sort of floating science known more or less perfectly to practical electricians, and expressed in a fragmentary manner in papers by Faraday, Thomson, Maxwell, and others, great in this science. The one is so dissimilar to the other, that, according to the author, it has been quite impossible to give students any sufficient or even approximately sufficient text-book."

These are the principal reasons why the author has departed from the ordinary course usually adopted in works of this kind, and that therefore, instead of beginning the book with simple experiments, he has given a general synthetical view of the science, in which the main phenomena are described, and the terms employed explained. He considers that this general view of the science cannot be made very easy reading, and that if this portion of the book be mastered, the student will readily be able to understand what follows. This seems to us to be a great departure from the usual mode, but it is by no means one that can be looked upon with distrust, for the very name of the author would be a guarantee that his experience has taught him what is necessary in imparting the rules of such a science as here brought before us. The author of this work acknowledges assistance from Sir W. Thomson, Professor J. C. Maxwell, Mr. Culley, and Mr. C. F. Varley, and also to Mr. W. Bottomley, Mr. W. E. Ayrton, and Mr. F. W. King for examining the proofs. In conclusion, we must say that we cordially recommend this work to the attention of our readers, and we doubt not that they will receive instruction as well as pleasant reading by the perusal of its pages. The general get-up of the book reflects great credit upon the publishers.

General Literature.

The Life and Remains of John Clare, the Northamptonshire Peasant Poet. By J. L. CHERRY. With illustrations by Birkett Foster. London: Warne and Co. Northampton: Taylor and Son.

FEW things can be imagined more painful than such a life as that of poor Clare; nor can anything be more discomforting to speculate on than the numbers of such gifted, youths who die and make no sign, born in the lowest walks of life with the promptings of genius in them, but who, through the pressure of adverse circumstances, never accomplish anything, and struggle, and suffer, and die wounded and, it may be, stained by the struggles and temptations so fruitless where no outward help is rendered, and where all has to be done in weakness and blindness by the poor strugglers. There are many such, but John Clare's case is enough at present, as it comes up through the publication of the present volume.

He was the son of a poor labourer, so poor and so weak that he was unable to follow his employment in the fields, and, as his only available resource in his misery, had to subsist on five shillings a week, obtained from the parish. His mother, in this respect, was not more fortunate, as regarded her health, than his father; no wonder, therefore, that the lad himself was weakly, and that being blessed, or cursed, with higher promptings than his position called for, he sought such knowledge as he could pick up, and strove to express himself in prose and verse as a relief to his ardent feeling, and a vent for his struggling thoughts. By this time the world, or those rather who care to know anything about John Clare, have learned how he worked himself into notice, and became, in a certain sense, popular as a poet—how he was patronised by the rich, and, to some extent, spoiled by boon companions—and how ultimately he sank into despair, and became the inmate of a lunatic asylum, where he finished his days after thirty years' detention. It should be stated that during much of that time Clare was quite harmless, and was not strictly confined, so that all things considered the mad-house was better for him than the sane world outside, where his only sure refuge was the workhouse.

Of Clare's poetry much need not be said. It had praise even beyond its merit; still there are many pieces to be found in his writing that describe the face of nature in its many changes with great felicity and truth; and even in the present volume—the contents of which were, for the most part, written in the asylum where he spent so much of his life—there are many touching lines, and some strong lines as well, which show what might have been accomplished by Clare had not poverty and its thousand evil attendants crushed him so ruthlessly. These lines, which refer to his own condition, possess depth and pathos—

I am! yet what I am who cares, or knows?
My friends forsake me like a memory lost.
I am the self-consumer of my woes,
They rise and vanish, an oblivion's host,
Shadows of life, whose very soul is lost,
And yet I am—and live—though I am tossed
Into the nothingness of scorn and noise—
Into the living sea of waking dream,
Where there is neither sense of life, nor joys,
But the huge shipwreck of my own esteem
And all that's dear. Even those I loved the best
Are strange. Nay, they are stranger than the rest.
I long for scenes where man has never trod—
For scenes where woman never smiled or wept—
There to abide with my Creator, God,
And sleep as I in childhood sweetly slept.
Full of high thoughts unborn. So let me lie,
The grass below, above the vaulted sky.

Clare, however, will be chiefly known for his rural poetry, much of which is really good, and for the deep misfortune of his life. Had he been born under different and better influences he might have made himself a name to be remembered even amongst our worthiest; as things were he has left many sweet bits of genuine verse worth turning to in an idle moment. From his earlier works we take the following sonnet:—

THE THRUSH'S NEST.

Within a thick and spreading hawthorn bush
That overhung a molehill, large and round,
I heard, from morn to morn, a merry thrush
Sing hymns to sunrise, while I drank the sound
With joy! and often, an intruding guest,
I watch'd her secret toils from day to day;
How true she warp'd the moss to form her nest,
And modell'd it within with wood and clay.
And by-and-bye, like heathbells gilt with dew,
There lay her shining eggs, as bright as flowers,
Ink-spotted-over shells of green and blue,
And there I witnessed, in the summer hours,
A brood of Nature's minstrels chirp and fly,
Glad as the sunshine and the laughing sky.

It is much to be desired that national education wisely carried out, and an improved condition for our workers in the fields, will in the future give a better chance to such lives as John Clare's, and that in the days that are to come the "genial current" of the soul will not be frozen into despair and madness.

The Lives of the Saints. By the Rev. S. BARING-GOULD, M.A. John Hodges, Bedford-street, Strand.

THE publication of this book we take to be a lucky speculation. There are a great many saints who, for a long time, have been under a cloud in England—so thoroughly out of fashion, in fact, as to be useless for any purpose whatever. Mr. Baring-Gould, however, is now bringing them before the notice of the public, and if the prices named in the advertisement be obtained, and the twelve volumes sold pretty extensively, a better thing will be made by these dead and gone pious personages than could have been realized any time during the last three hundred years.

Of some of these saints, the information given is so scanty, that one is puzzled why it should enter into any one's head to put it before the public. The life of Saint Ulpian, or Vulpian, occupies less than three lines. We give it verbatim. "Ulpian, or Vulpian, was a youth of Tyre, who was cast into the sea, in a leathern sack, together with a dog, and an asp, which were sown up in it with him." We cannot help pitying two at least out of the three, but there is not much edification to be received from the story taken as a whole.

Of Saint Walaric we are told that "a boy was sent by his mother with oblations (eulogia) of bread and bottles of wine, and the lad, boy-like, took toll of the food and drink on the way. This St. Walaric detected, and gave the boy a sharp rebuke." It would have been interesting if Mr. Baring-Gould had told us how the delinquent was found out, and what the exact words were the Saint used, or whether, instead of words, he administered the rebuke with his fist or his toe.

There is much more, not quite so good as this, in Mr. Baring-Gould's volumes, which we cannot advise anyone to read unless they have a natural predisposition for nonsense.

The Choice Humorous Works of Mark Twain.—Now first collected. John Camden Hotten.

SAY what we may of the extravagances of this writer, we cannot help being amused by his eccentric drolleries. Sometimes we find passages so gross in their exaggerations so out of truth and nature, so altogether offensive by their want of taste and sense, that we feel disposed to throw the book from us and never look at it again. But we cannot forget how amply this is compensated for by whole pages of most genuine humour, funny nonsense, inimitable eccentricity, that we are compelled to restrain ourselves and turn again to its pages to find food for hearty side-shaking laughter, such as may be looked for in vain elsewhere. This volume contains some of Mr. Clemens best things—for after all, we suppose, Mark Twain will have to be known by his true name—and we are sorry to add, though in far less proportion, some of his worst. The longer works, "The Innocents Abroad" and the "New Pilgrim's Progress" must by this time be pretty well known to most readers, and though sometimes there may be a disposition to skip, it is difficult to indulge in such a practice lest some of the good things should be missed, from which so much pleasure is derived.

Our traveller in these pages takes quite an utilitarian view of many things, which Europeans regard with great veneration, and in this way the sensibilities of certain readers will be sometimes shocked. On the whole, however, the spirit of the writer is fair and honest enough, and it would be over-nice to take offence if a traveller from a country where there are no antiquities, except such as may have been imported in the course of trade, should laugh at what cannot be grown or manufactured at home.

Some of the short sketches are inimitable. "Journalism in Tennesee" is extravagant, but life in Tennesee is also extravagant. "Baker's Cat" is worth reading again and again. The sagacity of that animal was wonderful. "How I Edited an Agricultural Paper" furnishes many useful hints on the subject of editing in general. The principal thing we have to complain of in this volume is that the publisher had sent out most part of it before in separate shillingworths. The present volume really contains nothing new, and we know of no reason for its publication beyond the fact that it contains some quaint illustrations, which make the book pleasanter, on the whole, to look at and read. Those who have not seen Mr. Hotten's previous issues of Mark Twain will find this a very pleasant book. We give the following from Mr. Twain's editorial experience as a droll way of putting the ignorance that may sometimes be found in company with ordinary editorial omniscience, especially in a country like America, where it is considered that any man who declares his incompetency for even the most difficult undertaking is unfit for anything.

It must be premised that the editor of an agricultural paper is about to start for his holidays, and the writer takes his post during his absence. After the first number was issued the new editor has several visits. One from an old gentleman of the blandest type, who began thus: "Are you the editor?" I said I was. "Have you ever edited an agricultural paper before?" "No, this is my first attempt." "Very likely; have you had any experience in agriculture practically?" "No, I believe I have not." "Some instinct told me so," said the old gentleman. . . "Listen, and see if it was you that wrote this—'Turnips should never be pulled, it injures them; it is much better to send a boy up, and let him shake the tree.' Now what do you think of that? for I really suppose you wrote it." "Think of it? Why I think it is good; I think it is sense. I have no doubt that every year millions and millions of bushels turnips are spoiled in this township alone by being pulled in a half ripe condition, when if they had sent a boy up to shake the tree." . . . . This benevolent old gentleman had no sooner taken his departure, when a cadevorous man with a bristly beard "darted within the door, and halted motionless, with finger on lip, and head and body bent in listening attitude. . . . . He turned the key in the door and came elaborately tiptoeing toward me till he was within long reaching distance, when he stopped, and after scanning my face with intense interest for a while drew a folded copy of our paper from his bosom, and said—"There, you wrote that. Read it to me—quick! Relieve me—I suffer." I read as follows, and as the sentences fell from my lips I could see the relief come. I could see the drawn muscles relax, and the anxiety go out of the face, and rest, and peace steal over the features like the merciful moonlight over a desolate landscape:—"The guano is a fine bird, but great care is necessary in rearing it. It should not be imported earlier than June nor later than September. In the winter it should be kept in a warm place where it can hatch out its young." There is much more of this, as funny as need be, but the reader must look for it in the volume.

"The Geological Evidences of the Antiquity of Man." By Sir Charles Lyell, Bart., M.A., F.R.S. Published by John Murray, Albemarle-street. 1873.

"Light Science for Leisure Hours. Second series, with a Sketch of the Life of Mary Somerville." By Richard A. Proctor, B.A., Camb. Published by Longmans, Green, and Co.

"Sanitary Engineering." By Baldwin Latham, C.E. Published by Spon and Co.

These important works were received too late to enable us to deal with their contents in accordance with their merits.

JUTE PAPER—IMPROVEMENTS WANTED.

The *Dundee Advertiser* was recently, for the first time, printed on paper made from jute fabric, and announced its intention of printing upon jute fibre.

At the same time the above-named journal made the following offer of premiums:—

1. A premium of £50 for the best ream of paper made entirely from jute, suitable for printing this journal, of its average size and weight, and of which the maker will undertake to supply fifty tons at a price not exceeding 4½d. per lb.

2. A premium of £100 for the best ream of paper made entirely of jute, suitable for printing this journal, of its average size and weight, and of which the maker will undertake to supply one hundred tons at 4d. per lb.

The specimen reams to be delivered at the *Dundee Advertiser* Office on or before 1st September, 1873.

Proceedings of Societies.

SOCIETY OF BIBLICAL ARCHÆOLOGY.

June 3rd.—Dr. Birch, President, in the chair.—The following candidates were elected Members: Messrs. J. C. Anderson and A. M. Cameron.—The following papers were read: "The Legend of Ishtar Descending to Hades," by Dr. H. F. Talbot. In this paper the author translates from the tablets the Goddess's voluntary descent into the Assyrian Inferno. "On the Egyptian Preposition," by M. P. Le Page Renouf. "On a remarkable Babylonian Brick described in the Bible," by Mr. R. Cull.

ZOOLOGICAL SOCIETY.

May 20th.—Dr. E. Hamilton, V.P., in the chair.—Lord A. Russell exhibited specimens of, and made remarks upon, the different varieties of the Carp (*Cyprinus carpio*) cultivated in the German fish-ponds. Mr. Sclater remarked upon the most interesting animals observed in the gardens of some of the Continental Zoological Societies which he had lately visited. Dr. E. Hamilton read a note confirmatory of the extraordinary fecundity of the Chinese Water Deer (*Hydropotes inermis*). Mr. H. E. Dresser exhibited some rare birds from the Ural, amongst which were the Smew (*Mergus albellus*) in down, nestlings of the Rustic Bunting (*Emberiza rustica*), and several specimens of Lilljeborg's *Salicaria magnirostris*, which last he believed to be identical with *Acrocephalus dumetorum* of India. Letters and communications were read: by Sir V. Brooke, Bart., "On the African Buffaloes," which he considered might be reduced into two species, *Bubalus caffer* and *Bubalus pumilus*,—by Mr. St. G. Mivart, on Lepilemur, Cheirogaleus, and other Lemurine forms, to which were appended remarks on the zoological rank of the Lemuroidea in the natural system,—by Messrs. Sclater and Salvin, on some Venezuelan Birds collected by Mr. J. M. Spence, amongst which were examples of two species believed to be new to science, and proposed to be called *Lochmias sororia* and *Crypturus cerviniventris*,—from Mr. R. Swinhoe, on the White Stork of Japan, which he referred to a species different from the *Ciconia alba* of Europe, and proposed to call *C. Boyciana*,—and by Mr. H. E. Dresser, on certain Oriental species of Eagles (*Aquila*).

METEOROLOGICAL SOCIETY.

May 21st.—Dr. Tripe, President, in the chair.—Mr. H. Colborne, Rev. H. Ffolkes, and Mr. E. E. Glyde were elected Fellows.—The discussion on the question, "Can Uniform Times of Observation be introduced for the Normal Observations?" was resumed. Remarks were made by the President, Messrs. Glaisher, Symons, Sopwith, Bicknell, Scott, Salmon, Strachan, and Dr. Mann as to whether local or Greenwich time should be used, and whether the hours of 9 a.m. and 9 p.m., or 9 a.m., 3 p.m., and 9 p.m. should be recommended to observers. The meeting was of opinion that the hours of observation should be 9 a.m. and 9 p.m., and that local time should be adopted. The next question considered was the "Division of the Year for the Calculation of Mean Results." After some discussion, Mr. Sopwith suggested that a Committee should be appointed to draw up a statement of questions on all matters connected with this subject, and that the same be sent to the Fellows of the Society, requesting their reply on all or any of the questions. This suggestion was adopted by the meeting. A paper "On Land and Sea Breezes," by Mr. J. K. Laughton, M.A., was read, in which the author stated that he was of opinion that sufficient attention had not been paid to the subject, and that more careful examination would show that the ordinarily recorded theory is not in accordance with the facts observed. That these prove that sea and land breezes are seldom strong where the land is of that arid nature which gives rise to extreme differences of temperature, and that they frequently are strong where, from the verdant nature of the country, the differences of temperature are trifling; also that the sea-breeze begins out to sea, and comes slowly in, and that the land-breeze comes, in the first instance, distinctly off the land, sometimes as sharp squalls. The necessary conclusion from these observations is that the breezes are winds of propulsion, not of aspiration; and whilst it seems probable that the propelling force, in the case of the sea-breeze, is due to the rapid formation of vapour over the sea, the land-breeze may be the re-action or return of the column of the air which has previously been forced upwards by the sea-breeze. A short paper, by the Rev. F. W. Stow, M.A., was then read, giving an account of the observations he had made at Hawsker on the same subject; after which Mr. R. H. Scott gave a description of a double rainbow observed at Kirkwall.

ROYAL SOCIETY.

May 15th.—W. Spottiswoode, Treas. and V.P., in the chair.—The following papers were read: "On Jeypoorite," by Major W. A. Ross; "On the Periodicity of Rainfall, in connection with the Sun-spot Periodicity," by Mr. C. Meldrum; "On the Heating of a Disc by rapid Rotation in Vacuo," by Messrs. B. Stewart and P. G. Tait; "Determination of the Number of Electrostatic Unit in the Electro-magnetic Unit made in the Physical Laboratory of Glasgow University," by Mr. D. M'Kichan; and "On the Extension of the Numerical Value of π," by Mr. W. Shanks.

May 29th.—The President in the chair.—The Croonian Lecture, "On Muscular Irritability after Systemic Death," was delivered by Dr. W. B. Richardson. The following abstract contains a sufficient summary of the scope and purport of the lecture: After all outward manifestations of life have ceased in animal bodies, there often remains for a longer or shorter period an irritability or life of the muscles—a phenomenon which has been the subject of profound study by anatomists and physiologists for centuries past. The object of the lecture was to show, from a series of original investigations, the conditions under which this irritability exists, how it may be excited, sustained, suspended, or destroyed. The points brought forward for demonstration had reference to the effects of cold, of the motor forces (mechanical, calorific, electrical), of the effects of removing or supplying blood, and of the influence of various chemical agents, inorganic and organic, on irritability. In brief, the lecturer showed (a) that cold, within certain well-defined limits, suspends but does not destroy irritability; (b) that all the motor forces quicken and destroy it; (c) that the removal of sufficient blood produces extreme irritability in living voluntary muscles, and does not produce immediate cessation of irritability in the muscles after death; (d) that some chemical substances, including several inorganic soluble salts, suspend irritablity by maintaining fluidity in muscle, but do not sustain the nervous activity by which muscle is excited to motion; some organic compounds, however, belonging to the nitrites and to the cyanogen series, suspend both muscular irritability and nervous activity so effectually, that for a long time after apparent death from their action the living functions of lower-class animals may return. The physiological evidences adduced were compared with certain phenomena that had been observed, in rare instances, in the human subject after death, and an account was given of the author's various attempts to preserve blood in a condition that fitted it to be employed for the purpose of restoring reduced irritability. In conclusion, Dr. Richardson said, that the next grand development of the medical sciences would be the perfection of research on the subject to which his lecture had been devoted.

GEOLOGICAL SOCIETY.

May 14th.—J. Prestwich, Esq., V.P., in the chair.—The following communications were read: "On the Genus Palæocoryne, Duncan and Jenkins, and its Affinities," by Mr. P. M. Duncan; "Notes on Structure in the Chalk of the Yorkshire Wolds," by Mr. J. R. Mortimer; and "On *Platysiagum sclerocephalum* and *Palæospinax priscus*, Egerton," by Sir P. de Malpas Grey-Egerton, Bart.

May 28th.—Professor Ramsay, V.P., in the chair.—Messrs. R. Pictor, T. Devine, and C. S. Seyton, were elected Fellows.—The following communications were read: "The Glaciation of the Northern Part of the Lake-District," by Mr. J. C. Ward, and "Alluvial and Lacustrine Deposits and Alluvial Records of the Upper Indus Basin," by Mr. F. Drew.

CHEMICAL SOCIETY.

May 15th.—Dr. Odling, President, in the chair.—Dr. H. S. Armstrong delivered a comprehensive lecture, "On Isomerism," pointing out that the generally received position theory was incompetent to explain many reactions which took place in the formation of metameric and isomeric substances. He suggested that the investigation of the thermal properties of compounds would establish facts which might ultimately enable us to obtain some insight into the matter. A lengthened and animated discussion followed.

ANTHROPOLOGICAL INSTITUTE.

May 20th.—Prof. Busk, President, in the chair.—Mr. Hyde Clarke read a paper "On the Egyptian Colony in the Caucasus," in which he pointed out that Herodotus, in his Second Book, had described the community of language, manners, colour, and appearance of the Colchians and Egyptians, which he had attributed to a colony of Sesostris. The Ude, the language of a small and declining population of the Caucasus, conformed to this requirement. On examination of its sounds, primary roots, and structure of words, as well as of its grammatical forms, the points of resemblance were illustrated, particularly with the Bashmuric dialect of Coptic. He examined the nouns, adjectives, pronouns, verbs, and particles, as well as the syntax, and showed the common laws affecting the Coptic and the Ude, and still more the Hieroglyphic and the Ude. Thus the cause of the difference between the Hieroglyphic and the Coptic was shown to be, in many cases, due to original causes, dependent on the comparative grammar of the language, for which a basis was provided. It confirmed the opinion of scholars as to the Coptic being the key for the language of the Hieroglyphics. It was also shown that, both in Caucasia and the Nile regions, there were corresponding members of the earlier Agouv, Abkhass, and other groups; and that the structure of Egyptian grammar is by no means originally due to Semitic, but to much earlier influences. While the great antiquity of Egyptian civilization is thus supported, the question is raised, whether Egyptian may not have exercised a great effect on the sub-Semitic languages.

June 3rd.—Prof. Busk, President, in the chair.—The President exhibited and described a new apparatus for measuring with ease and accuracy the cubic capacity of skulls. Prof. Rollesten, while approving generally the method of Prof. Busk, differed with him as to the nature of the material to be employed; he thought that sand is objectionable, as being subject to hygrometric variation from which rape seed is entirely free. Prof. Rolleston exhibited a remarkable bronze sword, found in the bed of the Charwell, near Malden, a bronze spear from Speen, near Newbury, and other implements. The President exhibited a series of stone implements from St. Vincent; and Mr. A. W. Franks, through Mr. W. Simpson, exhibited a bow and poisoned arrows lately used by the Modoc Indians, and found in Capt. Jack's stronghold, in the lava beds of Siskiyon County, California. The Rev. Dunbar I. Heath contributed "Notes on a Mural Inscription in large Samaritan Characters, from Gaza," and claimed for it a greater antiquity than the Moabite Stone. Mr. Howorth read a paper, entitled "Strictures on Darwinism, Part II., the Extinction of Types." Prof. Rolleston, Mr. Boyd Dawkins, and the President, combated the criticisms of the author.

THE FLINT IMPLEMENTS OF THE DRIFT.

A CROWDED meeting of the Victoria (Philosophical) Institute was held at the house of the Society of Arts recently, the Right Hon. the Earl of Harrowby, K.G., in the chair.

The proceedings commenced by Captain F. Petrie, the Honorary Secretary, announcing that the Institute had carefully invited all leading palæontologists to be present, with a view to a thorough and impartial examination of the subject, and the wish that all who took an interest in it should be present, must have been apparent to those that had seen the notices inserted in all the leading newspapers. He was sorry to say that amongst those who had sent letters of regret were Professor Huxley, Tyndall, and Mr. Pengelly.

The Chairman then called upon Mr. W. D. Michell to read his paper, which was illustrated by a large number of diagrams, and three collections of specimens, including one set produced by Mr. J. Evans. After showing the great importance of the question as affecting the origin and antiquity of man in his relation to the post-glacial epoch, after all the many attempts of proving the existence of man in the Miocene strata, these "chipped flints" of the Drift-type are the only ever, up to the present hour, fully recognised evidences we possess, be they authentic or otherwise. How the flint-flakes, their chips or knives, scrapers, awls of the archæologist, were most of them the common and natural forms in which flint is noticed to break up, fracture and cleave universally, wherever the flint and silicious stones are to be found. These pattern forms exactly agreed and were indeed fac-similes in many instances, when made by the commonest methods, such as Blake's stone-crusher and common ways used at Brandon in breaking up hundreds of tons of coarse tabular flint either for building or road purposes. Any one could satisfy himself easily of this at Brandon, &c. The flint-like obsidian as well as other silicious stones naturally cleave into the flake, as mineralogical museums plainly show, so that these minor forms are Nature's own manufacture, as the raw material, often touched up and improved upon by fresh chiselling in a very artistic manner even, and so often are made fit for arrow-heads, &c., by savages down to the present day. The Drift-tools, called Javelin or Spear-head and ovals were remarkable, and often wonderfully "chipped flints," were found in the beds, the finest in the world having been extracted from those at Santon Downham. Mr. Poley's collection at Brandon was unique, yet all these, from whatever bed they may come, present universally the same identical characters, thus forming a type of their own, most clearly defined and marked out; making a chasm and gulf between those of the first and those of the second stone age which it was impossible to bridge over. A gradation—1, size; 2, form showing extent of chipping the surface of the flint boulder, illustrated by diagrams, from the worst up to the best specimen,—was then gone into. From this very important crucial test, Mr. Michell, seeing it exactly corresponded with the chipped surface of thousands of shattered flints in the Drift-beds, and as well from years of experience of the sea-boards of England, was compelled to come to the conclusion that an ape-human or savage human hand never did or could have done this chipping on them. This opinion has been always fully confirmed by every flint-knapper or other Drift-tool hunter of Norfolk and Suffolk he had ever talked over the matter with. Lapidaries and workers in stone and marble also fully agreed with him, as did mineralogists. These natural causes entered into in detail first direct attention to the general mechanical and erosive forces of flint-sand as seen in the denudation of rocks, the power of blown sand to form curious apparently worked stones, together with the tremendous power of the sand-blast, &c. The grinding and marble polish given to the shattered flints in these beds, by the combined action of sand and water; the erosive and chipping action of this general combined action were brought clearly out by specimens and diagrams.

The discussion was commenced by Mr. J. Evans, who said that he had long differed from Mr. Whitley, who had alluded to the vast mass of flint-flakes in the flint-beds of England, and considered to be natural, and not manufactured. Now he (Mr. Evans) held, that when the inhabitants of this island had been dependent for fire solely on the use of flints, and if twenty splinters were made in forming one such flint, we should, in a thousand years have millions upon millions of flint-flakes, made artificially.

Mr. Whitley stated that at St. Achille he found in the sand-pits 3,000 flint axes; and by calculating the number of flint implements to the population in the neighbourhood, he found there must have been 6,000,000 old flint axes to each inhabitant. Again, at Axminster, where those holding Mr. Evans' views said there must have been a manufactory of flints, he found, in carrying on engineering works, that had there been such a manufactory it must have extended over 600 square miles. Could such a manufactory have existed? He found that these flakes in the drift could be traced across Yorkshire to the north of Ireland, and all through to Cork—they were, in a geological stratum, generally two feet below the surface of the soil in Belgium. This stratum was six feet thick. This conclusively proved that they were not of human origin, but of a geological origin. With regard to the flint knives, he found that Blake's stone-crusher—a very intellectual manufacturer—made quite as good knives as were found in the drift. With regard to the necklaces at Abbeville, they were found to be formed of globular stones. Now, Professor Rupert Jones discovered that these were simply fossil sponges, some of which had the hole through, and hence they were said to be formed for necklaces by man.

Dr. Carpenter stated that he was not a geologist or palæontologist. He begged to state that scientific men had no desire to go beyond human belief. With regard to the implements brought by Mr. Evans he thought it absurd to say that they were not artificial. He came to that conclusion by the exercise of his common sense.

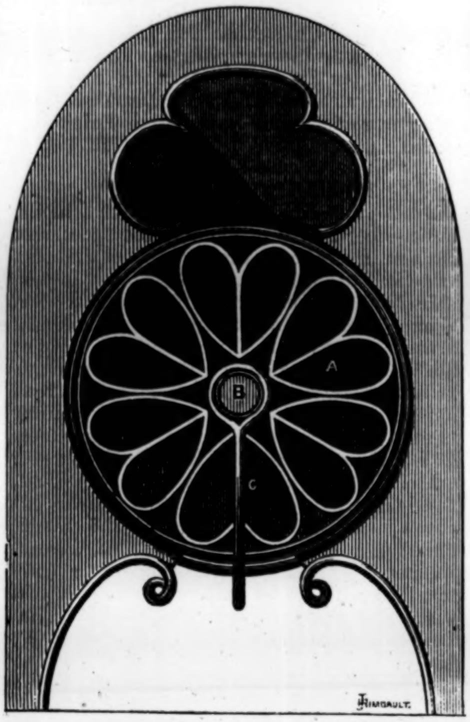
Captain Petrie rose and said that none would deny but that Mr. Evans's were artificial. What was held by Mr. Michell was, that the flints of the first palæolithic age were natural, those of the second, like Mr. Evans's, artificial.

Mr. Borlase drew attention to the causes of the colouring of the flint implements as being due to the minerals in the soils.

Professor Tennant produced several of the implements formed by Flint Jack. He acknowledged that Mr. Evans's were artificial, but that those on the table, which Mr. Michell held to be natural, were evidently broken by natural percussion.

A vote of thanks having been passed, Lord Harrowby replied, and the meeting separated.

ASH'S REVOLVING GRATE.



THE waste of fuel and heat in ordinary open fire-grates has long been a topic on which much discussion has taken place. Many inventions have been promulgated, and many patents been obtained by individuals, for the objects of economizing fuel and obviating the great waste, which, in these days of high-priced coals and fuel, are features of very great importance. The illustration above is for a grate, which, we think, is well deserving of attention, and will, we have every reason to believe, secure, to a great extent, those advantages which are essential in the economizing of fuel and heat. The object of this invention is to so construct and arrange the constituent parts of stoves and fire-grates, especially those of the open kind, so that each feed of fuel may, immediately on being supplied to the stove or grate, which can be effected at the top if that usual mode be preferred, be at once placed at the bottom of the stove or grate, and thus the generation of smoke by the fresh unignited fuel will be prevented, as the products of combustion will be burnt or consumed by the mass of ignited fuel which remains above the fresh feed. To effect this the fire-grate, in circular or nearly circular form, is hung upon a central pin, or axis, upon which the grate may be turned. Suitable openings are provided for the admission of fuel. The grate travels in a circular guide, or against a plate. In the illustration above, the fire-grate travels in the guide formed by the stove, being so made as to receive the fire-grate A. In the illustration, the grate is supported on two axes, one being at the back of the stove (not seen), and the other, marked B, is supported by means of a bracket, C, which proceeds from the back of the stove, and terminates in a bearing for the axis or pin B. It is obvious that a grate may be constructed with only one axis, or pin, as the inventor proposes; and also that the axes may be fixed at the sides of the grate instead of at the back or front. The inventor of the above stove, or grate, is Mr. George Ash, dentist, of 15, Great Marlborough-street, Regent-street.

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LORD RICHARD GROSVENOR, M.P.

Chairman of the Council:

SIR ANTONIO BRADY.

NOTICES.

THURSDAY, JULY 10TH (Extra Meeting).—Consideration of Proposed Parliamentary Action on the Patent Laws. To commence at 8 o'clock p m.

COUNCIL MEETINGS.

THURSDAY, 10TH.—Special and Ordinary at 7 p.m.

Monthly Notices.

The Fishmongers' Company have, it appears, caught the infection of the Technical Science Advance Movement, and awarded Mr. W. K. Parker fifty pounds for his researches on the anatomy of fish, and a grant of twenty pounds per annum for three years for aiding his researches. Could this great and rich company not do something to promote a Piscatorial Technical College?

Gun-cotton, according to Colonel Younghusband's experiments, can be kept damp and non-explosive for a long time, and used at any time by employing a detonating cap to fire it.

Mr. Bessemer, the retiring president of the Iron and Steel Institute, has founded a gold medal to be awarded annually in recognition of merit in promoting metallurgy, whether by original research or literary labour.

Non-inflammable pockethandkerchiefs are amongst the latest "notions" of Yankee land. Asbestos has been introduced somewhat successfully into the structure of textile fabrics.

Aluminium has been suggested by Dr. Clement Winkler as suitable for German coinage, which it is just now proposed to reform. He considers Aluminium and silver might replace silver and copper as now used for some of the German pieces of money.

The star shower seen in November, 1872, and at Madras as a comet in December, it is suggested by Professor Klinkerfues, of Gottingen, has some connection with a similar star shower which, according to records amongst Byzantine annals to which he has had his attention directed, occurred A.D. 524. It seems the comet referred to moves in the orbit of Biela's comet, though at a considerable distance. The Professor considers that a comet seen in China in 1162 is the same or has some close connection with Biela's.

The great sea serpent has, it seems, again made his appearance, as we learn from the *Zoologist* that the Rev. John Macrae (of Glenelg, Invernesshire), and the Rev. David Twopenny (of Stockbury, Kent), saw an animal, believed by them to be that called the Norwegian sea-serpent, off the western coast of Scotland, while on an excursion from Glenelg to Lochowen, in August, 1872. They give sketches of what they saw; and the editor expresses his conviction that there does exist a large marine creature, unknown to naturalists, which has given rise to the belief in a sea-serpent.

Aniline, according to M. Langorrois, is capable of arresting the putrefaction of animal matters, even when exposed at a high temperature to atmospheric influences.

The cultivation of mushrooms in railway arches has been recently suggested by the Rev. W. J. Berkeley—our great authority on cryptogamic botany.

We extract the following from the *Athenæum*:—A new gas-burner, known as Wallace's burner, has been found, by Mr. G. J. Warner, to be peculiarly adapted for producing sensitive flames. The gas flame issuing from such a burner is singularly sensitive to sound, especially to high notes.

For upwards of forty years the ipecacuanha plant has been cultivated in the Royal Botanic Gardens, Edinburgh; but it is only of late that the plant has been propagated. The continued destruction of the ipecacuanha plant in Brazil, and the risk of scarcity in the supply of this valuable remedy for dysentery in India, called attention to the desirableness of introducing its cultivation into our Indian possessions. Great numbers of the plant have, therefore, been sent from Edinburgh, and extensively distributed in India. A paper on this subject, by Professor J. H. Balfour, will be found in the last part of the "Transactions of the Royal Society of Edinburgh."

M. Desains was elected, by the Académie des Sciences, at the *séance* of the 12th of May, a member of the Section of Physics, in the place of M. Babinet, deceased.

The death is announced of Christopher Hansteen, for many years Professor of Astronomy and Applied Mathematics at the University of Christiania, Norway, and Director of the Observatory there. He made many valuable contributions to our knowledge of terrestrial magnetism, and was sent by his Government on an expedition into Siberia, with that object, in the year 1828; to him we principally owe the establishment of 11·1 years as the length of the periodicity of the magnetic declination, a period which also agrees with that of the maximum and minimum frequency of the solar spots, and appears to be connected with that of many other terrestrial phenomena. Prof. Hansteen died on the 15th of April last, at the advanced age of upwards of 88.

L'Institut for the 7th of May gives the important portions of a paper, by M. Chautard, "on the Influence of Rays of Various Colours in the Spectrum of Chlorophyl." Amongst other matters of interest, he explains the persistence of green in the leaves of some plants late in the autumn to be due to the presence of resinous or fatty matter in the plant. He finds that chlorophyl dissolved in fixed oils is not sensibly altered after many days' exposure to full sunshine,—dissolved in water it changes rapidly.

M. Czermak, of Leipzig, communicated, in December last, to the Academy of Sciences of Vienna, some curious experiments on Hypnotism—or, as it is often called, Braidism—as observed upon man, and, more especially, on animals. He shows that the causes producing sleep and catalepsy, which are the most efficacious, are those which secure the fixedness of attention and of the eyes. The experiments are an extension of the celebrated *Experimentum mirabile*, described by Athanasius Kircher in 1646. It appears that by very simple manipulation fowls and other birds may readily be thrown into a cataleptic state. Czermak's paper, published in Pflüger's *Archiv*, is an interesting contribution to our knowledge of this obscure condition of our nervous system.

It is worthy of note that Mr. E. H. Hoskins, of Lowell, Massachusetts, U.S., has showed by experiment, that collodion may be usefully employed for the preservation of charred paper. Many papers charred in the great fire of Chicago—bank-notes, &c.—were treated with collodion, which forms a thin transparent film, and dries in a few minutes. The printing or writing can be read through this film. We give this on the authority of the *Scientific American*.

It is reported that a new hydro-carbon has been obtained from crude anthracene, a result of coal-tar distillation. The name of "Phenanthrene" has been given to it.

Alorcin acid is the name given to a new acid obtained from aloes by Herr P. Weselsky described by him in the *Annalen der Chemie*.

The use of platinum into alloys of nickel and German silver has been patented by M. Helonis, of Paris, and such alloys are, it appears, thereby rendered little liable to oxydation, and a brilliant colour is given to aluminium bronze by the introduction of a small quantity of platinum.

It seems that the old story of "bread with gin in it" is not without foundation according to Mr. Thomas Bolas, who writes in the *Chemical News* stating that forty 2lb. loaves contain about the same amount of alcohol as a bottle of port.

Mr. G. J. Symons has, says the *Athenæum*, just issued his British Rainfall for 1872. The most remarkable rainfall of the year appears to have taken place on July 6th—7th. On the 6th, at five stations in Cornwall and Devonshire, more than 4 inches of rain fell; and on the 7th a similar quantity was registered in Wales: more than 2 inches being registered at all the stations in Great Britain. "It is almost impossible to realize the bulk or weight of water thus precipitated. It is considerably within the truth if we take the area as 125 miles from E. to W., and 200 miles from N. to S., or 25,000 square miles, and assign to it a mean rainfall of 2 inches; yet even that would give some 750,000,000,000 gallons." While on this subject, it is worthy of notice that Mr. C. Meldrum, of the Meteorological Observatory, Mauritius, in a paper read before the Royal Society, on the 15th of May, appears to show a real periodicity of rainfall in connection with sun-spot periodicity.

"Science Gossip" in the same journal states:—Professor Tyndall by his thirty-five lectures in America returned 23,100 dols. The surplus above expenses, amounting to upwards of 13,000 dollars, was conveyed by an article of trust to the charge of a Committee, consisting of Prof. Joseph Henry, General Hector Tyndall, and Professor E. L. Youmans, who are authorized to expend the interest in aid of students who devote themselves to original research. Professor Tyndall also gave 250 dollars to the Yale Scientific Club for a like purpose.

Professor Dove, of Berlin, has communicated to the Royal Prussian Academy of Sciences some observations on the rainfall in the various parts of the Spanish Peninsula, with comparative observations from the northern coast of Africa and the interior of Algiers. These observations he published in a recent number of the *Monatsbericht* of the Academy.

Kirchman recommends for gilding iron the employment of sodium amalgam. This leaves a coating of quicksilver, upon which chloride of gold is poured, and the mercury volatized by heat.

A new work, by Professor Alberto Errera, will shortly be brought out by E. Loeschera, entitled "Industria e Marina dell' Adriatico Superiore," or the naval industries of Italy as represented at the Exhibition of Vienna.

Dr. G. Bellucci, in the *Gazzetta Chimica Italiana*, appears to have cleared up a question which has been under discussion since, in 1856, Dr. Scoutetten stated that the oxygen evolved from plants in sunshine is ozone. Dr. Bellucci gives, in his monogram, a *résumé* of all that has been done, and records his own careful experiments, which show that ozone is not given off by plants in sunshine.

Pig-iron rich in silicon can, according to the researches of M. S. Jordan, be produced by a furnace worked slowly at a very high temperature, provided the ingredients of the charge be rich in silica and alumina.

Baron Liebig is to have a monument, a committee having been formed in Munich to promote it.

Gardeners have long affirmed that the moon's rays give great activity to the growth of mushrooms. M. Charbonnier, of Paris, states that he has observed in his aquaria a very remarkable growth of cryptogamus vegetation under the influence of the light of the full moon.

Dr. Percy has written to the *Times* stating that more than twenty years since, he manufactured an alloy with manganese, which so much resembled German silver that it was sold as such to electro-platers without their detecting any difference.

The cultivation of science spreads steadily. A scientific society has recently been established at Buenos Ayres, Mr. A. Luis Huergo for its first president. According to their programme, the members have arranged for carrying out several branches of original research.

Mr. Sortais has devised an electrical apparatus, to be placed in the holds of ships, for the purpose of giving warning in case of leakage. A current is established by entrance of water, and a communication is thus set in operation, which gives notice to the officers on deck.

The *Athenæum* states that a magnet of extraordinary carrying power has been constructed by the well-known French physicist, M. Jamin. Whilst artificial magnets have not hitherto been made to carry more than four or five times their own weight, this magnet is able to sustain upwards of twenty-two times its weight. It is constructed of a great number of thin well-magnetized plates, instead of the thick plates generally employed.

It is just now a matter of interest to know that, in 1872, 1,900,000 tons of iron were made in the United States; 923,527 tons were produced in Pennsylvania.

It is stated by M. Austin that glycerin mixed with the water in the boilers of steam-engines prevents the deposition of the lime salts, and, consequently protects the boiler from incrustation. About one pound of glycerin to every 300 or 400 lbs. of coal burnt is said to be sufficient for this purpose. The report on Boiler Incrustation, in the *Journal* of the Franklin Institute for March, does not mention this; but the reporters confess "that they are groping in the dark, and cannot conceal from themselves what must be apparent to others, that the question is yet an open one."

It is found by Dr. Walz that glacial acetic acid forms an excellent solvent for iodine, certainly not inferior to alcohol.

THE VICTORIA INSTITUTE, OR PHILOSOPHICAL SOCIETY OF GREAT BRITAIN.—We have received the annual address and report of the year, &c., and have to reserve them for future publication.

The Inventors' Institute.

AT the meeting on Thursday, 12th June, 1873, Hume Williams, Esq., barrister-at-law, Vice-Chairman of the Council, in the chair, Mr. Williams commenced the proceedings by reading a letter from Sir Antonio Brady, the Chairman of the Council, explaining that the reason of his non-attendance was urgent important engagements, and expressing his sense of the great national importance of the subject proposed to be brought under the consideration of the meeting.

After some remarks by the Chairman with reference to the difference between bogs properly so called, and fens, the first being by no means unhealthy, possessing, so to speak, antiseptic and preservative qualities, whilst malaria was a concomitant of the latter, and generating agues, fevers, &c., he called upon Mr. Love to read his paper.

Bogs (said Mr. Love), from top to bottom vary in density, when dried, each strata varying in gravity from one-sixth that of water to equality and sometimes more. The colour of the cut peat when dry varies in proportion to the density; that on the top being a light drab, each strata getting darker and denser till it becomes at the bottom almost as black and dense as coal. This is more especially the case when the bogs are of great depth, such as the bog of Allen, in Ireland, which in some parts reaches fifty feet, its average being calculated at about fifteen feet, and the area of this and those of a similar nature above 1½ million acres; and of mountain bogs there are about 1¼ million acres; besides these, there are about a quarter of a million acres of low fen or marshes, producing good meadow and pasture, which should be left out of our calculation, as it would be unwise to make stagnant lakes of them, for the sake of the fuel they would produce. Bogs have been divided by scientific men into high and low; and by practical men into bogs or mosses, and fens or marshes, the former being well represented by the bog of Allen, in Ireland, and Chatmoss, in Lancashire, and the latter by the fens of the eastern division of this country and the marshes of Kent and Sussex. Of these vegetable earths of all sorts we have over five million acres in the three kingdoms, of which at least four million acres would be benefited immensely for agricultural purposes, by the removal of the vegetable material, the subsoil in general when drained and cultivated soon becoming highly productive of all kinds of cereals, green crops, and grass.

High bogs or mosses have heretofore been difficult to reclaim profitably, being composed of vegetable matter saturated with tanin and humic acid, which prevents decay and the development of food fit for plants of that high class used by animals; the expense of drainage being great, the interest of the money expended therein has swamped the profits, owing to its taking some years before the rains wash out these acids, and the combustion of these inert fibres reduces them to fertile earth.

Another cause is, that as the water is drained out the bog collapses, and there not being depth enough, freed from these acids; supplies of these are raised by the capillary action of its fibrous nature, and arrests the advance of combustion or decay, so that the great necessity is a cheap means of under drainage, that can be repeated after each collapse, until a fertile soil is formed by this decay to a sufficient depth and density for profitable farming.

Fens, or marshes, are in low situations on the banks of rivers subject to their floods, producing reeds and aquatic grasses which contain but little tanin, and when laid dry by drainage rapidly decomposes into rich black earth, forming the finest pastures and productive land; by excavating these for fuel most valuable land would be converted into wastes of stagnant water, a process which is now going on in Germany, France, and some other countries, but at present not desirable in this country, and will not be for a long period of time.

Bogs, or mosses, are only productive of heaths, mosses, and lichens, with occasional plants of bog myrtle, birch, and stunted firs; even after drainage it takes a great number of years for the fibrous, soft, spongy material of the surface to decompose into soil dense enough to carry grass and agricultural crops; but as the understrata is convertible into good land, the conversion of the upper incumbent bog into fuel is very desirable, seeing that it is one means of increasing the inhabitable and productive area of our country. Bog, as it is dug or excavated, contains from 75 to 90 per cent. of water, and, as a general rule, the more water it contains the less it shrinks in drying, the spongy surface bog not shrinking more than 25 per cent., while the soapy, solid bottom shrinks 80 per cent. In practice air-dried peat contains from 15 to 25 per cent. of water, and coal, as sold by merchants, from 12 to 20 per cent.

The art of pounding and treading decomposed bog earth into a homogeneous mass, and then spreading it out into a thin layer, and cutting it at right angles into pieces, or shaping it into balls by hand, and laying it out to dry, has been in practice for ages; but it was not until the superior action of machinery was brought to bear upon the living and growing fibrous spongy bog that it could be reduced into that homogeneous state necessary to make it shrink into dense fuel. This has, with more or less success, been done in Germany and Bavaria, where the price of coal being higher and labour much lower than with us, gives the peat fuel manufacturers a greater chance of success. In 1837 machinery was introduced both into Scotland and Ireland for pulping bog into a homogeneous mass that dried into fuel of great density, and estimated at two-thirds the value of coal, weight for weight, but the labour of carrying 80 per cent. of water to the machine and out again on to the drying ground, to be carried off on the wings of the wind, has hitherto completely swamped its commercial success. It is not to be contended that a ton of dense peat will give out any more heat than a ton of the same bog cut into peat, that when dry is four or five times the bulk of the dense peat; but this enormous bulk made it unweildly and expensive to use, as well as almost impractical to carry from the place of production to that of consumption; therefore, before peat can be carried by rail, or any other means, to compete with coal, it must be got sufficiently dense to allow of from eight to ten tons being put into a truck $14 \times 7 \times 6$ feet $= 588$ cubic feet; this is amply attained by a density of 45 lbs. per cubic foot, which is equal to that of hard wood; we have before us in these samples proof that the density required can easily be obtained.

The difficulty of drying ground, the immense labour of carrying a hundred tons of material to the machine, then away from it and laying out to dry, cannot be estimated at less than 6d. per ton, or 50s. for the resultant twenty tons of fuel. This half-crown per ton I will save by my contrivance, the great novelty of which is that my machine cuts through the surface of the bog, excavating a tract for itself, pressing the surplus water out, and cutting the material into thin slices, which are beat and rubbed into homogeneous pulp, then rammed down into a compact piece the width of the machine, cut into the sized pieces desired, and laid down upon the same place to dry that the material was raised from.

Gentlemen who have had experience in the manufacture of dense peat, either by hand or machine, are aware that if (while in a state of pulp) laid upon a smooth damp surface the peats will adhere to it, and require cutting or other force to separate them from the ground. This was one of the greatest difficulties to be got over in my system, and now accomplished by using a corrugated sole, or slide, to the machine, which leaves the surface of the drying ground also corrugated, the peats resting on the ridges allows the air to circulate through the valleys, or furrows, under the wet peats; they rapidly dry, as rapidly shrink, in all directions, leaving spaces between them increasing in width. Another difficulty has been the tough fibrous material of the upper half-depth of these bogs gathering in the pulping apparatus absorbing power, and often blocking the machine. This I have got over by the use of sharp knives that cut the large slice excavated into very thin slices, reducing the fibres into very short lengths before being delivered to the pulping apparatus.

My machine is upon quite a new principle, as well as novel in many of its details, suggested during years of study and experience of the great labour of handling such an immense weight of water, carrying it to and from the machine, the immense area of drying ground required, all creating heavy expenses; at last the idea came of hauling, the machine laid flat on the bog excavating a slice of such thickness as to produce pulp, to cover the ground passed over, such a thickness as could be dried into the most dense fuel. This, with some of its most important details, I have just patented, and wish to give you information as to its economy of labour and power of production, the whole being worked by an ordinary traction engine with steam cultivating apparatus.

On the middle of the machine is a large rigger, or riggers, round which the hauling rope is passed, one end being fast to the steam engine, or windlass, and the other end attached to the winding drum of the windlass. This is the working rope; that is, the machine, when hauled by it towards the engine, operates; the engine, by this means, has double hauling power, and the friction of the ropes gives motion to the rigger, which drives all the works of the machine.

Another rope, named the idle rope, is attached to, what we will call, the back end of the machine. This rope is carried as far up into the bog as is most economical in practice—say ¼ of a mile,—where it is passed round the pulley or rigger of a Howard's or any other good self-acting anchor, and then attached to the drum of a windlass, the action of which hauls the machine up into the bog to the anchor; then the windlass being reversed, the working rope hauls the machine toward the windlass and engine, which are on the sound ground outside the bog. The machine, while operating, travels at half the speed of the rope, the rope having to bear both the strain required to haul the machine and that required to drive the machinery used to manufacture the slice of bog into peat. The working drum will be geared so as to have great power therefore to coil slowly, say at the rate of one mile per hour. The idle drum having merely to haul the machine over the bog, a very high speed and lighter rope will be used, travelling, say, at six miles per hour. The width of machine I propose to use is four feet nine inches, which, allowing for loss in reversing, is about ½ an acre for every lineal mile operated upon. In nine hours we will get over eight miles, absorbing eight hours in working, and 1⅓ in running up the bog idle, being 9⅓ hours a day, covering four acres with 2½ inches thick, which, when dry, will yield 20 tons per inch deep of pulp, or 50 tons of dry fuel per acre, the four acres yielding 200 tons of dry fuel.

From the middle of March to the end of August, 120 days' work ought to be obtained, producing 24,000 tons of fuel.

The same arrangement carries into action my draining engine, which I have also patented.

This engine also goes over a mile in one and one-sixth hours, doing eight miles of drain from four to five feet deep per day, leaving a clean cut bore or tunnel, six inches in diameter, at £3 per mile, or 10s. per acre drained, sixteen and a half yards apart. After this drainage has caused the bog to collapse so that these drains are within two feet of the surface. The second drainage should take place. Then during the following winter months, the peat manufacturing machine should be used without the pressing, stamping, and peat cutting parts, the putting aside of which will enable a greater depth to be operated upon, enough to give from four to five inches of finely comminuated bog, which will give up freely to the rainfall. The sterilizing acids, which, with the rainfall, will pass away through the drains, leaving earth as dense as if it had been 20 years under ordinary cultivation, and fit to make rough pasture. Of this work at least four acres a day will be done at £3 an acre. 250 days' work per annum ought to be got out of each set of machines, engines, and tackle, which will cost less than £2,000, on which for tear, wear, and renewal

	£	s.	d.
I charge at 25 per cent. per annum	500	0	0
250 days' peat fuel, say 1½ tons a day, at 7s. 6d. per ton ..	140	12	6
Oil, grease, cotton, waste, &c., at 5s. a day	62	10	0
2 machine men at 6s., and engineer at 8s.............	250	0	0
Man fetching water for engine 3s., and 3 lever-porter boys at 1s. 8d. a day	100	0	0
Annual expense of Plant	1,053	2	6
24,000 tons of peat fuel dried, hauled, stacked, & thatched at 2s. 3d. per ton	2,700	0	0
Manager and clerks, &c.	800	0	0
Landlords' royalty of 6d., and patentees of 3d. per ton of dry fuel—24,000 at 9d.....	900	0	0
Patentees royalty of 10s. per mile of drain on 520 miles..	260	0	0
Patentees royalty of 10s. per acre on 260 acres..........	130	0	0
Annual expense of Drying and Storing	4,790	0	0
Total	5,843	2	6
£5,000 capital at 40 per cent. dividend, £2,000; and surplus, £496 17s. 6d.	2,496	17	6
Total Disbursements	8,340	0	0

RETURNS.

120 days producing 24,000 tons peat fuel at 5s. a ton..	£6,000	0	0			
65 days draining at 8 miles—520 miles at 60s.	1,560	0	0			
65 days cultivation at 4 acres—260 acres at 60s.	780	0	0			
Total returns				8,340	0	0

Looking at this important subject from a national point of view, with our eye fixed on the fact that the subsoil of bogs generally forms first-rate land after the bog stuff has been carried all away, and the sun and air allowed free action upon it; in fact, after drainage, and the application of improved cultivation, these soils generally attain the highest type of fertility. Such being the case, all the shallowest bogs ought to be operated upon first, for the manufacture of fuel, for inasmuch as two or three slices of about four inches thick will be worked off per annum, nearly a foot will be annually worked off, by which means, in a few years, each succeeding year we would have considerable numbers of fertile farms added to our country.

The deep bogs, many of which are still undrained and in a state of growth, and yearly increasing in depth by the prostration of each year's produce of rough sour vegetation, such bogs when drained 16½ yards apart and four or five feet deep, immediately change from a state of increasing depth to that of decay and speedy collapse, sometimes at first sinking at the rate of a foot per annum, becoming denser every year until the whole becomes as dense as the bottom, which makes dense fuel, merely by cutting into thin peats and drying, which my machine does, by dispensing with the pressing and pulping parts; the slice or slices excavated being cut into thin strips, then turned on edge, the better position for drying, and then cut into the lengths desired.

These bogs, when once started growing grass, and re-drained, as often as the sinking and decomposition lowers the surface to within two feet of the drains; and dressings of lime or marl, with cattle and sheep grazed on them, kept increasing both in size and fatness, by the economical use of corn and cake; by such management, these large areas of barren wastes will fast be converted, first into useful grounds for breeding stock and healthy game, gradually becoming richer and stronger, till they become like the feeding marshes of Essex and Kent, feeding large herds of cattle and flocks of sheep, while the climate would be vastly improved by the extraordinary change from its state of being swamped with stagnant water, remaining to be evaporated during the spring and summer months, loading the air with oppressive humidity and pestilential vapour, spreading mildew over the wheat fields of the surrounding district. Effectual drainage allows the rains to percolate through the earth into the drains, purifying and fertilizing the ground, redeeming the air from polution, leaving it in its pristine purity to give health and vigour to the sweet pastures and green herbage covering its vast expanse, increasing the health, wealth, and blooming beauty of our lovely country.

When Mr. Love had concluding the reading of his paper,

The Chairman invited discussion, and in doing so remarked that the present paper was directed wholly or chiefly to the mechanical means of removing the bog so that the substance removed might be air-dried for fuel, and the locality of the bog by drainage rendered fit for farming purposes, Mr. Love's proposition, as far as he understood it, being to use an ingenious development of Fowler's steam plough. He considered that the subject of bog utilisation should take a wider scope, and therefore he would specially invite to join in the discussion several gentlemen he saw before him in the room, who to his knowledge took considerable interest in the subject of treating bog and peat by chemical and mechanical processes in order to obtain valuable products therefrom, so that the meeting might have the benefit of their experience. The subject of utilisation of bog and peat earth was one of very great practical importance to this country now that the cost of coal fuel was at such a high rate, and he could himself testify that the reclamation of bog land was usually a costly affair. He had known members of his own family make attempts in that direction which proved anything but profitable to them.

Mr. Fothergill, C.E., stated that he had some plans for the utilisation of peat, a subject he had given much attention to, but at the present time he was suffering from the effects of a cold which so affected his speaking powers that he would rather, if the Institute could so arrange it, reserve his observations for some future time. He showed specimens of dense and compact pieces of peat fit for fuel, and having the appearance of cannel coal or jet. He stated that he had made peat charcoal, and obtained various other products from bog earth, all which had been effected by machinery and processes of a very economical character. He considered peat fuel far superior to coal for iron manufacture and steam raising purposes.

Mr. Francis Fuller wished to know if the peat shown by Mr. Love was compressed. Mr. Love stated it was not compressed, but simply air-dried. He would also ask, did the use of the peat charcoal improve the iron? This was answered in the affirmative.

Mr. Rumble, C.E., referred to experiments made on board the Tyne boat for Mr. Penn, and remarked that although very favourable results had been obtained, yet they would have been far greater if the firegrate had been adapted for the purpose of burning peat fuel. He had not the slightest doubt that both compressed and uncompressed peat could be used for practical purposes with very great advantage.

Mr. Fred Ransome, C.E., thought Mr. Love's invention one that merited the attention of all practical men. If peat charcoal were so valuable in iron manufacture as had been stated, and he cast no doubt upon it, the subject ought to be thoroughly discussed by the Inventors' Institute.

Mr. A. J. Murray said he quite concurred in what Mr. Ransome had stated, and he was prepared to move that the question be adjourned for further discussion on another evening.

Mr. E. W. Coulthard, C.E., said that Mr. Love's paper, and the statements of those who had taken part in the discussion, had shown the importance of this subject; he would, therefore, move that the council be requested to adjourn the discussion.

Mr. F. H. Varley seconded this motion, which was carried unanimously.

The Chairman then moved a vote of thanks to Mr. Love for his able and interesting paper read before them that evening.

Mr. C. G. Carttar seconded this motion, which was carried unanimously.

Mr. Love having briefly returned thanks, the meeting, by a vote of thanks to the chairman, was brought to a close.

The council have not yet been able to arrange any day for the adjourned meeting.

At the council meeting (special) held the same day (12th of June,) previously to the above meeting, the minutes of two previous meetings were read and confirmed as correctly entered.

A letter from Sir A. Brady was read accounting for his absence.

The following resolutions were then passed: (on the motion of Mr. A. J. Murray, seconded by Mr. Coulthard), "That Sir Antonio Brady be re-elected chairman of the council;" and (on the motion of Mr. Mr. Ransome, seconded by Mr. Carttar,) "That Mr. Hume Williams be elected vice-chairman of the council for the ensuing year;" also (on the motion of Mr. Carttar, seconded by Mr. A. J. Murray,) "That Mr. Varley be elected chairman of the ordinary council for the ensuing year;" also (on the motion of Mr. F. H. Varley, seconded by E. C. Coulthard, "That notices as to the council meetings, and other meetings of the Institute published in the journal of the Inventors' Institute (Scientific and Literary Review) shall be good and sufficient notice, and when transmitted by post to the members shall be deemed circulars within the rules."

A discussion then ensued as to the treasurership of the institute, but as the time for opening the ordinary meeting was nearly up, and no decision had been arrived at, it was agreed that until further orders, the present Treasury or Finance Committee, viz., Capt. Selwyn, Messrs. H. Williams, C. G. Carttar, Coulthard, and Campin (the secretary), should remain in office.

Mr. Hume Williams, in the course of the proceedings, solicited the attention of the council to the reported action of the Government with regard to the remuneration of inventors. He was informed that it had been decided that no payment should be made for the use of any invention by the Government of this country. This seemed to him a monstrous proposition, and in order that something effectual might be done in this matter, he had placed himself in communication with Mr. Thomas Webster, Q.C., Mr. Aston, and other authorities in Patent Law questions, and he hoped the council would appoint an early day for a conference on the subject.

Messrs. Steinhoff, Vickers, Collier, Cadett, and Vacherot, having been admitted members, were ordered to be entered in the list of members of the Inventors' Institute.

SANITARY AND EDUCATIONAL EXHIBITION.

In connection with the Social Science Congress, to be held at Norwich, from the 1st to the 8th of October next, there will be an exhibition of educational, sanitary, and domestic appliances, based on the experiment which proved so successful at Leeds, in 1871. The large and spacious Drill Hall has been placed at the service of the Social Science Association, (with the sanction of the Government,) by the commanding officer. The object of the exhibition is to bring under the notice of the public generally, and particularly those who are interested in social, sanitary, and educational questions, the latest scientific appliances for improving the public health and promoting education. Among these may be mentioned:—All matters relating to house construction, connected with which are building materials, light, warming, ventilation, and interior ornamentation; flues, fire-places, stoves, boilers, furnaces, gas apparatus; cisterns, baths, piping, filters, fountains, lavatories, and all things connected with the supply and use of water; drain pipes, tubes, sinks, traps, troughs, closets, urinals, filters, and all plans, diagrams, sections, models and specimens of sewage and drainage contrivances; cooking apparatus and food manufacturing machines, culinary utensils, specimens of food, adulterations, condensed fluids, preserved meats, light and cooling beverages; disinfectants, deodorants, antiseptics, and other things relating to the prevention of disease and preservation of health; hygiene in clothing and dress; plans and models of school-buildings, forms, desks, books, maps, and other articles used in teaching; and all sorts of appliances appertaining to the advancement of sanitary science, the promotion of education, and the improvement of the health and domestic comfort of the community at large. The exhibition will be open to exhibitors from all parts, and the management will be under the superintendence of a committee. A mere nominal charge will be made for space and admission—just sufficient to cover the costs of preparation and defraying the working expenses.

To Correspondents.—In reply to a correspondent (M., Manchester), we believe the "Little Dressmaker" is progressing well. It has not been noticed lately in this journal, simply because of delay in receiving copies.

At a recent meeting of the Victoria (Philosophical) Institute, Mr. Phené read a paper on "Prehistoric Traditions and Customs in connection with the Sun and Serpent Worship," which was illustrated with many diagrams.

APPLICATIONS FOR PATENTS.

CONTINUED FROM PAGE 106.

Harris. Deckle straps used by paper makers.—A. V. Newton. Apparatus for facilitating the feeding of brush-making machines (com.)—O. D. Deacon. Construction of ships' boats to be used for preserving life at sea.—S. S. Lewis and G. L. Hawkins. Process of cleaning cotton waste and other fibrous materials.—W. C. Stiff. Fastenings for metallic hoops or bands used in bailing cotton and other substances.

On April 29th.—1545 to 1558.—J. Cort. Apparatus for drilling and tapping cast-iron main pipes. — P. Harris, R. Harris, and W. Love. Apparatus for regulating the speed of marine engines.—G. Woods. Reed organs.—(Complete specification).—J. Barrow and W. Barrow. Improvement in kilns.—B. J. B. Mills. Repeating ordnance, and cartridges therefor (com.)—H. Ciotti. A new centrifugal and re-acting pump.—A. Dobel'e. Machinery for cleaning, sorting, and flattening grains, especially oats.—M. Nolden. A water cleansing apparatus.—J. Blondel and E. S. J. Bruneau. Boilers and furnaces for generating steam.—W. R. Lake. Printing telegraph apparatus (com.)—W. Brown. Treatment of sewage and the manufacture of manure therefrom.—C. Russell. Apparatus for the manufacture of nitrate of soda (com.)—A. M. Clark. Preparation and employment of indigo-blue dye (com.)—J. T. Sprague. Instruments for measuring electric currents, resistances, and forces.

On April 30th.—1559 to 1570.—A. Strange, F.R.S., and K. H. Cornish. Machinery for preparing, spinning, or throwing and doubling cotton, silk, wool, and other fibrous or filamentous substances.—R. Roper. A new or improved captain's bridge, constructed as a self-launching life raft.—L. Maignan and Jules Franck. Apparatus for stoppering bottles, vessels, and other recipients.—J. Holroyd. Apparatus for bowling, or projecting the balls used in the game of cricket.—R. Hill. Breech-loading small arms.—J. McSkimming. Improvements in umbrellas, sunshades, and parasols.—J. Stabb, sen. Sash weights, and the manner of attaching new cords or lines to window sashes and frames.—J. E. Barraclough. Kitchen ranges.—E. W. A. Bartlett. Means for the relief and cure of diseases of the feet.—H. H. Henson. Construction of roads.—J. Ashworth. Motive-power engines.—A. V. Newton. Manufacture of explosive compounds (com.)

On May 1st.—1571 to 1578.—G. W. Rhoades. Construction ahd general arrangement of couplings for railway cars and other carriages, whereby the same are rendered automatic in their action.—H. A. Bonneville. Machines for piling textile fabrics (com.) (Complete specification).—G. Whight. Railway carriages (com.)—A. Browne. A new or improved process and furnace for the manufacture of metallic alloys (com.)—E. Duffee. Screens for coal-dust purifiers. (Complete specification.)—T. Cullen. Apparatus for lowering and releasing or detaching ships' boats, and raising and stowing the same on board ship.—W. Clegg. Machinery for etching and engraving clyndrical and other surfaces.—P. O. Whitehead. Apparatus for damping warps.

On May 2nd.—1579 to 1594.—P. J. Davies. Apparatus for controlling, regulating, measuring, and arresting the flow or discharge of fluids or liquids, and preventing waste thereof.—W. F. Henson. Manufacture of raised or cut piled fabrics from certain materials.—W. M. Cameron. Life-rafts.—A. Henry. Breech-loading firearms.—H. H. Stevenson. Means or apparatus for propelling vessels —F. Fisk. Electric printing telegraphs (com.) (Complete specification).—G. T. Bousfield. Torpedoes (com.)—C. A. McEvoy. Apparatus to be used when firing fuses by electricity.—H. Hus. Lamps for burning petroleum spirit and other highly volatile liquids. — A. J. Maher. Anti-friction axle bearings or boxes, applicable to tramway and other carriages.—A. I. H. Parent. Manufacture of buttons for garments.—A. M. Clark. Cigarette papers (com.)—C. J. Smith. Fire-escapes.—H. M. Kelshaw. Wire card covering for carding wool, cotton, silk, flax, tow, and other fibrous substances.—P. Hugon. Manometers.—J. T. Griffin. Ploughs and similar appliances, and apparatus for clearing the breasts of weeds and stubble, and for distributing manure and other bodies into furrows (com.)

On May 3rd.—1595 to 1608.—S. S. Williamson and D. Parsell. Steam engines.—S. S. Williamson and D. Parsell. Apparatus for pumping, draining, and ventilating, and obtaining and applying motive power, especially for use underground.—William Wright. Manufacture of gas for heating and illuminating purposes, and apparatus for the same.—D. Mudie. Construction of venetian blinds.—J. Ward. Manufacture of Portland cement.—J. Wotherspoon. Manufacture of asbestos packing for piston and valve rods, pistons, pipe joints, and other similar purposes.—C. P. H. Ochwadt. Slide valve gear for steam engines.—H. Defty. A new or improved apparatus or machine for scraping and cleansing the exterior, sides, and bottoms of ships afloat, and other floating or submerged bodies.—J. Booth and J. B. Gardam. Means for tipping or finishing fabrics made in imitation of seal skins and other similar fabrics.—J. M. Plessnez. Motive-power engines.—J. Lott. New or improved appliances or apparatus for trimming the edges of straps, bands, and other articles.—D. Foster and W. Lockwood. Moulds for casting crucible, Bessemer, and other ingots.—J. H. Mills. Traction and tramway locomotive engines.—A. M. Clark. Machinery for making casks (com.)

On May 5th. — 1609 to 1624. — J. Turner. Manufacture of sheep shears.—A. Rollason. Manufacture of floor cloths, roofing, and waterproof fabrics generally, some of the waterproofing material used in such improvements being also applicable as a varnish and cement, and for making solid materials, and coating ships' bottoms, and other rough purposes.—F. Wirth. Self-lighting gas apparatus (com.)—S. S. Lees and F. Faulkner. Rousing apparatus for aiding the fermentation and facilitating the attenuation of saccharine worts and wash, and which is also adapted for producing a peculiar motion in any liquid requiring intermixture for bringing about certain definite results.—J. Stubbs, W. Stubbs, and C. Stubbs. Apparatus for filling sacks or bags with ground salt, grain, or similar substances.—P. Charles. Apparatus for supplying water to water-closets, and for the prevention of waste of water admitted thereto.—W. Botwood. Improvements in carriages.—J. B. Langley. Water gauges for steam boilers and other purposes.—J. Gray. Apparatus for perfecting the combustion of fuel in the furnaces of steam boilers, and effecting the better ventilation of stokeholes in general, and those of over-sea steamers in particular.—J. O. Spong. Pipes or apparatus for use in smoking. — Sir G. D. Fitzgerald, Bart. Tubular steam boilers.—C. J. Galloway and J. H. Beckwith. Slide valves of compound steam engines.—J. J. Lish. Building with concrete, and constructing, combining, and using apparatus therefor.—G. Haseltine. Manufacture of paper bags (com.) (Complete specification).—J. Imray. Process for smelting zinc, and apparatus therefor (com.)—H. Aspinall. Watches and chronometers. (Complete specification).

On May 6th.—1625 to 1640.—J. Grice and E. J. Harrison. Manufacture of gridiron steps for carriages.—J. Steen. Apparatus for heating the feed-water for steam boilers.—E. Wigzell and J. Pollit. Steam generators or boilers.—J. Imray. Caloric engines (com.)—J. Brown. Looms for weaving.—H. J. Haddan. Treatment of saltpetre and machinery therefor (com.)—E. G. Brewer. Machinery or apparatus for drying, applicable to the dressing or stiffening of fabrics, such as tulle and lace (com.)—S. S. Brown, F. Ayrton, and J. Austin. Looms for weaving.—S. Alley. Arranging retorts, and apparatus for charging and drawing the same.—W. M. Brown. Railroad car and other axle boxes (com.)—B. Acton and J. Mustard. Apparatus for feeding wool and other fibrous materials to carding machines.—E. Casper. Apparatus for washing and scouring wool, cotton waste, and other like substances (com.)—D. de Castro and R. Burton. Gas meters.—C. J. Ball. Drills for boring holes.—A. M. Clark. Pianofortes (com.)—A. M. Clark. Giffard Injector (com.)

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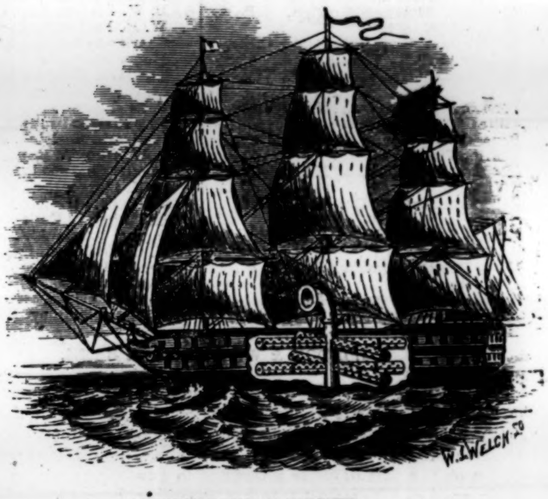

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